

Recycling Transportation Study Waukesha County, Wisconsin and City of Wauwatosa, Wisconsin

Prepared for:

Waukesha County
Administration Center
515 West Moreland Boulevard
Waukesha, WI 53188

City of Wauwatosa
Engineering Department
7225 West North Avenue
Wauwatosa, WI 53213

Prepared by:

AECOM
4135 Technology Parkway
Sheboygan, WI 53083

July 2010

AECOM Project No. 60156935

Author: Donald F. Pirrung, P.E.

Title: Senior Engineer

Date: July 2, 2010

Reviewer: Nancy K. Wright, P.E.

Title: Senior Engineer

Date: July 2, 2020

Table of Contents

EXECUTIVE SUMMARY	ES-1 to ES-4
1.0 INTRODUCTION	1
2.0 BACKGROUND	1
2.1 Waukesha County Recycling Program	1
2.2 City of Wauwatosa Recycling Program	1
2.3 Existing and Proposed Recycling Facilities	1
3.0 RECYCLING TRANSPORTATION ALTERNATIVES	2
3.1 Alternative A – Milwaukee MRF Using Recycling Trucks	2
3.2 Alternative B – Transfer Station in Waukesha, Haul to Milwaukee MRF	2
3.3 Alternative C – Haul to Optimal MRF Site	2
3.4 Alternative D – Wauwatosa Hauls to Milwaukee MRF	3
3.5 Alternative E – Wauwatosa Hauls to Optimal MRF Site	3
4.0 COST ANALYSIS CONSIDERATIONS	3
4.1 Sources of Cost Information	3
4.2 Common Assumptions and Cost Components	3
4.2.1 Volume of Recyclables	3
4.2.2 Collection Frequency and Projected Volumes	4
4.2.3 Single-Stream Recycling Capital Equipment Costs	4
4.2.4 MRF Operation and Maintenance	5
4.2.5 MRF Revenue	6
4.2.6 Modifications to Existing City of Milwaukee MRF	7
4.2.7 Modifications to Existing Waukesha County MRF	7
4.2.8 Recyclables Transfer Station Equipment	7
4.2.9 Transfer Facility Cost	7
4.2.10 Recyclables Transfer Facility Operation and Maintenance	8
4.2.11 Facility and Equipment Life Expectancy	8
4.2.12 Transportation Cost Estimates	9
4.3 Present Worth Analysis	11
5.0 COST ANALYSIS	12
6.0 DISCUSSION OF RESULTS	12
7.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	14
7.1 Summary	14
7.2 Conclusions	15
7.3 Recommendations	15

Tables

Table 1	Estimated Recyclables Tonnages
Table 2	Capital Equipment Information
Table 3	Estimated Capital Equipment Costs
Table 4	Estimated MRF O&M Cost
Table 5	Recycled Material Market Prices
Table 6	Recyclables Transfer Station Equipment Estimated Costs
Table 7	Recyclables Transfer Station Building Estimated Costs
Table 8	Recyclables Transfer Facility Estimated O&M Costs
Table 9	Building and Equipment Life Expectancy
Table 10	Waukesha County Transportation Summary
Table 11	Cost Summary for Each Alternative

Appendices

Appendix A	Alternative A - Milwaukee MRF Using Recycling Trucks
Appendix B	Alternative B – Transfer Station in Waukesha, Haul to Milwaukee MRF
Appendix C	Alternative C - Haul to Optimal MRF Site
Appendix D	Alternative D - Wauwatosa Hauls to Milwaukee MRF
Appendix E	Alternative E – Wauwatosa Hauls to Optimal MRF Site
Appendix F	List of Municipalities Included in Waukesha County MRF
Appendix G	References and Related Information on Cost Estimating
Appendix H	Labor and Maintenance/Fuel Costs for City of Milwaukee
Appendix I	Waukesha County Recyclables Collection Area Served by Veolia
Appendix J	City of Waukesha Recyclables Collection Area

EXECUTIVE SUMMARY

INTRODUCTION

Waukesha County and the City of Wauwatosa retained AECOM to compare capital, operation and maintenance, and collection costs for recycling facility location and transportation alternatives to serve Waukesha County and the City of Wauwatosa. One of the three alternatives investigated in this study is to have Waukesha County and the city of Wauwatosa transport their recyclables to a newly developed transfer station at the existing Waukesha MRF and then hauling the recyclables from there to a regional recycling facility in Milwaukee. Another alternative is to transport the recyclables directly to the regional facility in Milwaukee in the collection trucks. The third alternative is to transport the recyclables to an optimal MRF site approximately equidistant between Milwaukee and Waukesha County.

EXISTING RECYCLING PROGRAMS AND FACILITIES

Waukesha County owns a MRF at 220 South Prairie Avenue, Waukesha, which is operated by FCR. Veolia currently serves most of Waukesha County with dual stream recyclables collection on a weekly basis. Within the next year, Veolia will begin collecting single-stream recyclables every 2 weeks. Veolia's recycling operation is located in Hartland. John's Disposal Service located in Whitewater, serves the Villages of Eagle and Big Bend with single-stream recyclables collection every 2 weeks. The towns of Muskego, Vernon, Mukwonago, and Genesee are not currently served by the Waukesha County MRF.

The City of Wauwatosa recycling program is currently contracted with Waste Management Recycle America (WMRA) to serve the City with single-stream recycling every 2 weeks. The recyclables are transported to the WMRA MRF in Germantown, Wisconsin.

The existing MRFs in the area include the Waukesha County MRF, City of Milwaukee MRF, and WMRA MRF. The Waukesha County MRF has limited space and is not considered a long-term solution for Waukesha County.

The City of Milwaukee MRF, located at approximately 13th Street and Mount Vernon Street in Milwaukee, has outdated equipment and is nearing the end of its useful life as a MRF. Future use of the MRF includes upgrading the facility and equipment to sort single-stream recyclables.

The WMRA MRF in Germantown was built within the last few years and has capacity to process recyclables from the City of Milwaukee, City of Wauwatosa, and Waukesha County. The MRF currently serves the City of Wauwatosa as well as other customers throughout Wisconsin. WMRA also operates the City of Milwaukee MRF.

ALTERNATIVES

Waukesha County, City of Wauwatosa, and City of Milwaukee have several opportunities to serve their constituents with recycling collection and processing. Now is a very good time to assess these recycling options because the Waukesha County MRF and City of Milwaukee MRF equipment are near the end of their life, and all three governmental units could potentially benefit from a regional MRF. The recycling facility location and transportation alternatives included in this study are as follows:

- Alternative A – Milwaukee MRF Using Recycling Trucks
- Alternative B – Transfer Station in Waukesha, Haul to Milwaukee MRF
- Alternative C – Haul to Optimal MRF Site
- Alternative D – Wauwatosa Hauls to Milwaukee MRF
- Alternative E – Wauwatosa Hauls to Optimal MRF Site

The five recycling facility alternatives, are described further in the next section along with the cost evaluation for each alternative. All alternatives assumed that Waukesha County and City of Wauwatosa have a single-stream collection performed by a third party.

COST EVALUATION

The cost data is the best available cost information for the level of design detail available. These costs are budget costs, based on many different assumptions. Important assumptions that can affect costs include the volume of recyclables, collection frequency and projected volumes, single-stream recycling equipment capital costs, MRF operation and maintenance costs, revenue from sale of recyclables, modifications to existing MRFs, transfer facility equipment capital costs, transfer facility O&M costs, facility and equipment life expectancy, and transportation costs.

A present worth cost analysis was performed to determine the project costs for the recycling facility location and transportation alternatives. The present worth is the estimated amount of money needed to cover capital, operations and maintenance, and transportation costs over the term of the project plus the value of revenue from the sale of the recyclables in today's dollars. It is based on investing the money today at a certain interest rate to cover all costs over the project term and bringing profits (revenue) back to today's dollars.

For this project, a 15-year term is proposed to reflect the useful life of new processing equipment at the MRF. An annual interest of 3.5 percent is used.

The summary of the cost comparisons of recycling transportation alternatives addressing a design recycling tonnage and an estimated recycling revenue is included in the report as Table 11. The table includes capital, operation and maintenance, transportation, and total present worth costs. The representative costs are shown as a negative number. Revenue from recyclables is a positive number. Therefore, the alternative with the largest positive number is the most cost-effective solution for Waukesha County or City of Wauwatosa.

The analysis considers revenue sharing at 50:50 between the third party and the three governmental units. The 50:50 split is based on the City of Milwaukee's and Waukesha County's current agreement with third parties and this split can vary with contracts.

The cost allocation is based on recyclables tonnage with the City of Milwaukee contributing 44 percent, Waukesha County contributing 44 percent, and City of Wauwatosa contributing 12 percent.

The following includes a description of each alternative and a summary of the present worth analysis and resulting comparison of alternatives.

Alternative A – Milwaukee MRF Using Recycling Trucks

Waukesha County recycling trucks would collect the recyclables and travel directly to the City of Milwaukee MRF. The Milwaukee MRF would be upgraded to be a regional single-stream processing facility. This option has the lowest capital costs, but has a higher transportation cost than the other Waukesha County related alternatives. The Milwaukee MRF has a lower capital cost than the Optimal MRF site because the land is already City of Milwaukee owned, and the structure and most of the infrastructure is already in place.

Alternative B – Transfer Station in Waukesha, Haul to Milwaukee MRF

Waukesha County recycling trucks would collect the recyclables and travel to the existing Waukesha MRF, which would be converted into a recyclables transfer station. The recyclables would be compacted and transferred to the Milwaukee MRF using semi-trucks. Communities along the eastern side of Waukesha County would have their recycling trucks travel directly to the Milwaukee MRF instead of to the Waukesha transfer station.

This alternative reduces Waukesha County transportation costs, but adds the cost for upgrading the Waukesha MRF to be a transfer station.

Alternative C – Haul to Optimal MRF Site

Waukesha County recycling trucks would collect the recyclables and travel to a new MRF tentatively located in the New Berlin Industrial Park.

This alternative reduces the transportation costs for Waukesha County compared to Alternative A traveling to Milwaukee. The higher capital cost for the Optimal MRF site is due to the land purchase, new MRF construction, and associated infrastructure.

Alternative D – Wauwatosa Hauls to Milwaukee MRF

This alternative applies to the City of Wauwatosa and considers the recycling trucks directly traveling to the Milwaukee MRF. The Milwaukee MRF would be upgraded to a regional single-stream facility.

This alternative has an overall lower capital cost for the Milwaukee MRF as compared to the Optimal MRF site. The transportation costs for the City of Wauwatosa to either the Milwaukee MRF or Optimal MRF site are similar. AECOM evaluated transportation routes from Wauwatosa to the Milwaukee MRF using either the Interstate or City streets. The Interstate route using MapQuest considered this route to be significantly faster, but when recycling trucks are traveling on the Interstate at 3:30 p.m., traffic delays can be expected, thereby reducing the time savings compared to City streets. AECOM used the more conservative estimated times using the City streets for this evaluation.

Alternative E – Wauwatosa Hauls to Optimal MRF Site

Alternative E pertains to the City of Wauwatosa and evaluates the recycling trucks directly traveling to the Optimal MRF site at approximately 15600 West Overland Drive, New Berlin, which is on the east side of the New Berlin Industrial Park.

This alternative has a similar transportation cost as Alternative D, but has an overall higher capital cost due to the new Optimal MRF site option which includes land purchase, a new MRF, and associated infrastructure.

Other Potential Alternatives

There are other recycling alternatives which could be considered including:

- Other MRF site locations.
- Regional MRF serving additional governmental units or a third party.
- Third party MRF.

One other MRF site location could be the Wauwatosa Public Works property, thereby eliminating the land purchase with the Optimal MRF site. This option would be somewhat farther for Waukesha County than the Optimal MRF site.

The MRF could serve Waukesha County, City of Wauwatosa, and City of Milwaukee and additional communities or a third party. There are definitely economies of scale, but sometimes local issues may reduce the likelihood of a multiple-party agreement.

A third party MRF such as the WMRA facility in Germantown is a viable option and has capacity available. To improve the governmental units' bargaining power, a joint bidding process combining all three governments could be more advantageous than three separate smaller volume contracts.

CONCLUSIONS

Based on the findings and assumptions made in this study, the following conclusions are made:

1. The most cost-effective option for Waukesha County is Alternative A – Milwaukee MRF Using Recycling Trucks. This alternative has the lowest capital cost and highest total present worth for the County. This alternative likewise would benefit the City of Milwaukee and City of Wauwatosa.
2. The most cost-effective option for the City of Wauwatosa is Alternative D – Wauwatosa Hauls to Milwaukee MRF. This alternative likewise would benefit the City of Milwaukee and Waukesha County in developing a regional MRF.
3. The least attractive alternatives are those that incorporate the Optimal MRF Site. These alternatives have the highest capital cost due to the land purchase and large investment to construct a new MRF.

RECOMMENDATIONS

The following recommendations are made:

1. Continue negotiations among Waukesha County, City of Wauwatosa, and City of Milwaukee to further explore Alternative A – Milwaukee MRF Using Recycling Trucks for Waukesha County, and Alternative D – Wauwatosa Hauls to Milwaukee MRF.
2. If a regional MRF in Milwaukee cannot be implemented for any reasons, work out a joint arrangement among Waukesha County, City of Milwaukee, and City of Wauwatosa to pool resources to bid out recycling processing to a third party MRF to improve the bargaining power through a larger recycling volume.
3. If the regional MRF in Milwaukee cannot be implemented, and a third party MRF is not desirable, further explore the other recycling alternatives identified in this study.

1.0 INTRODUCTION

This study was commissioned by Waukesha County and the City of Wauwatosa to compare capital, operation and maintenance, and collection costs for recycling facility location and transportation alternatives to serve Waukesha County and the City of Wauwatosa. The alternatives include Waukesha County and the City of Wauwatosa transporting their recyclables to a regional recycling facility in Milwaukee, developing a transfer station at the existing Waukesha MRF and hauling to Milwaukee, or transporting to an optimal MRF site approximately the same distance between Milwaukee and Waukesha County.

2.0 BACKGROUND

2.1 Waukesha County Recycling Program

Waukesha County owns a MRF at 220 South Prairie Avenue, Waukesha, which is operated by FCR. Veolia currently serves most of Waukesha County with dual stream recyclables collection on a weekly basis. Within about a year from now, Veolia will begin collecting single-stream recyclables every 2 weeks for most of the county. Veolia's recycling operation is located in Hartland, Wisconsin. John's Disposal Service in Whitewater, Wisconsin serves the Villages of Eagle and Big Bend with single-stream recyclables collection every 2 weeks. The communities served by the Waukesha County MRF are listed in Appendix F. The towns of Muskego, Vernon, Mukwonago, and Genesee are not served by the Waukesha County MRF.

The Waukesha County MRF is located on a 2-acre site and has equipment housed in a very small structure. Waukesha County commissioned a recycling alternatives report prepared in September 2007 entitled "Waukesha County Recycling System and Capacity Study, Final Report" prepared by RRT Design & Construction and Gershman, Brickner & Bratton, Inc. (GBB), hereinafter referred to as the "2007 Waukesha County Study." The 2007 Waukesha County Study evaluated upgrading the existing MRF to serve as a regional MRF and developed preliminary costs to upgrade the facility. The property size limits its development potential for a regional MRF. The study also evaluated a regional MRF located in Wauwatosa which was recommended for further consideration to serve the City of Wauwatosa, Waukesha County, and the City of Milwaukee. The site would be located next to the Wauwatosa Public Works yard at 11100 West Walnut Road. From the study, the Wauwatosa site appeared to show the most promise for a regional MRF.

2.2 City of Wauwatosa Recycling Program

The City of Wauwatosa recycling program is contracted with Waste Management Recycle America (WMRA) to serve the City with single-stream recycling every 2 weeks. The recyclables are transported to the WMRA MRF in Germantown, Wisconsin.

2.3 Existing and Proposed Recycling Facilities

The existing MRFs in the area include the Waukesha County MRF, City of Milwaukee MRF, and WMRA MRF. The Waukesha County MRF has limited space and is not considered a long-term solution for Waukesha County.

The City of Milwaukee MRF, located at approximately 13th Street and Mount Vernon Street in Milwaukee, has outdated equipment and is nearing the end of its useful life as a MRF. The City of Milwaukee retained AECOM in 2009 to prepare a report entitled "Recycling Facility Alternatives Study, City of Milwaukee," which addressed a variety of alternatives and collection options. The most cost-effective approach was Alternative D – One Transfer Station at Existing City Facility (MRF). A second alternative

also showed potential consisting of Alternative F – Regional MRF at Existing City Facility. The City is currently pursuing both of these alternatives. The City of Milwaukee is participating with Waukesha County and the City of Wauwatosa in this study to see if a regional MRF is feasible. The regional alternative evaluated Waukesha County, City of Wauwatosa, and City of Milwaukee being served by the City of Milwaukee MRF at the Mount Vernon site.

The WMRA MRF in Germantown was built within the last few years and has capacity to process recyclables from the City of Milwaukee, City of Wauwatosa, and Waukesha County. The MRF currently serves the City of Wauwatosa as well as other customers throughout Wisconsin. WMRA also operates the City of Milwaukee MRF.

3.0 RECYCLING TRANSPORTATION ALTERNATIVES

Waukesha County, City of Wauwatosa, and City of Milwaukee have several opportunities to serve their constituents with recycling collection and processing. Now is the time to assess these recycling options because the Waukesha County MRF and City of Milwaukee MRF equipment are near the end of their life, and all three governmental units could potentially benefit from a regional MRF. The recycling transportation alternatives are as follows:

- Alternative A – Milwaukee MRF Using Recycling Trucks
- Alternative B – Transfer Station in Waukesha, Haul to Milwaukee MRF
- Alternative C – Haul to Optimal MRF Site
- Alternative D – Wauwatosa Hauls to Milwaukee MRF
- Alternative E – Wauwatosa Hauls to Optimal MRF Site

The description of each alternative is presented herein. Estimated costs for each alternative are presented later in this report. Under all alternatives, Waukesha County and City of Wauwatosa have single-stream collection performed by a third party.

3.1 Alternative A – Milwaukee MRF Using Recycling Trucks

Alternative A applies to Waukesha County and consists of the recycling trucks collecting the recyclables and traveling to the City of Milwaukee MRF on Mount Vernon. Alternative D is the counterpart of this option for the City of Wauwatosa.

The Milwaukee MRF would be upgraded to a regional single-stream facility.

3.2 Alternative B – Transfer Station in Waukesha, Haul to Milwaukee MRF

Alternative B applies to Waukesha County and evaluates the recycling trucks collecting the recyclables, then returning to the Waukesha MRF which would be converted into a transfer station. The recyclables would then be transported using semi-trucks to the City of Milwaukee MRF on Mount Vernon. Those recycling collection trucks that would have a shorter travel time from their route location to the Milwaukee MRF than from their route location to the Waukesha Transfer Station, are assumed to drive directly to Milwaukee to unload.

The Milwaukee MRF would be upgraded to a regional single-stream facility.

3.3 Alternative C – Haul to Optimal MRF Site

Alternative C evaluates Waukesha County hauling the recyclables to an Optimal MRF site. The Optimal MRF site location is theoretical and based on a general location approximately equal distance from the

Milwaukee MRF and Waukesha County MRF. The Optimal MRF site for this evaluation is considered to be in the New Berlin Industrial Park at approximately 15600 West Overland Drive, New Berlin, Wisconsin.

If this alternative is selected, an actual MRF site would need to be identified. There are properties in the area for sale, and some properties have structures. This alternative considers land purchase of 5 acres, a new building, infrastructure, and process equipment.

The east side and west side of the New Berlin Industrial Park were identified as potential MRF sites. The City of Wauwatosa Public Works property at approximately 111th Street and Walnut Street was also considered. No property acquisition would be necessary with this Wauwatosa site. The east side of the New Berlin Industrial Park was used for the study because it provided the best location for similar travel distances between the City of Milwaukee and Waukesha County average collection routes.

3.4 Alternative D – Wauwatosa Hauls to Milwaukee MRF

This alternative applies to the City of Wauwatosa and considers the recycling trucks directly traveling to the Milwaukee MRF.

3.5 Alternative E – Wauwatosa Hauls to Optimal MRF Site

Alternative E pertains to the City of Wauwatosa and evaluates the recycling trucks directly traveling to the Optimal MRF site at approximately 15600 West Overland Drive, New Berlin, which is on the east side of the New Berlin Industrial Park.

4.0 COST ANALYSIS CONSIDERATIONS

4.1 Sources of Cost Information

AECOM attempted to obtain actual cost data when developing the budget costs. The source of the cost data is noted when a cost is used for the first time. When the data was well researched in a previous report and updating this data was not possible due to time constraints, or in the opinion of AECOM updating the data would not yield a different result, the previous report data was used. If information was not available from either of the previously discussed sources, AECOM estimated these costs using their experience with historical data for similar projects. A summary of references (footnotes) and additional detail about some of the cost data can be found in Appendix G.

In all cases it is important to note that these are budget costs. As budget costs they are based on many different assumptions. The basis of these costs and the key assumptions are documented in this section.

4.2 Common Assumptions and Cost Components

There are several global assumptions and costs that will be used when determining the particular cost of each alternative. This information is presented in this section.

4.2.1 Volume of Recyclables

The 2007 Waukesha County Study presented data which projected the volume of recyclable materials that would be generated by City of Milwaukee and City of Wauwatosa. The 2007 Waukesha County Study also presents data projecting the volume of recyclable materials that would be generated by various communities within Waukesha County that are likely to use the services of a new MRF.¹ In July

¹ Note: Footnote #1 information is included in Appendix G.

of 2009, Waukesha County updated these figures to include 2008 data in a presentation to the City of Milwaukee and these figures are referred to as the current estimates.²

The volume of recyclables for these two scenarios is presented in Table 1.

In the presentation to the City of Milwaukee it was explained that some Waukesha County communities will probably not be part of a regional plan based on discussions with those communities. Therefore, the tonnage estimates from the presentation are viewed as more reasonable projections and, therefore, are incorporated into this report.

4.2.2 Collection Frequency and Projected Volumes

The projected volumes presented in Table 1 are based on collecting single-stream recyclables for Waukesha County and City of Wauwatosa every 2 weeks, which is the planned program.

4.2.3 Single-Stream Recycling Capital Equipment Costs

In order to estimate the equipment cost of a single stream system, AECOM contacted several of the industry leading MRF equipment manufacturers for current budget numbers (see Appendix G for additional information). In addition to soliciting information from equipment manufacturers, AECOM also obtained information from the public records about two recently installed systems that are approximately the same size.

A brief summary of the information collected is presented in Table 2.

For purposes of this report, AECOM will use the figures presented in Table 3 for estimating the cost of an installed single stream processing system:

It is assumed that if the Regional MRF were to purchase equipment for processing their recyclables, the 30,000-ton per year system would be selected. This system can be operated at a rate of 15 to 18 tons per hour therefore:

$$15 \text{ tons/hour} \times 40 \text{ hours/week} \times 52 \text{ weeks/year} = 31,200 \text{ tons per year}$$

$$18 \text{ tons/hour} \times 40 \text{ hours/week} \times 52 \text{ weeks/year} = 37,440 \text{ tons per year}$$

If the City of Milwaukee were to partner with Waukesha County and City of Wauwatosa, a 30,000-ton per year system would also be selected and a second shift would be added to achieve the 60,000-TPY processing rate. For this report, a 30,000-ton per year system operated for two shifts per day is used in the cost estimate.

An 80,000-ton per year system could be considered if the MRF has potential to accept additional recyclables from other communities or a third party. The 80,000-ton per year system tends to be a larger unit requiring more floor space. The lowest capital cost system is a process operated during two shifts. There will be more wear on the equipment if it is operated two shifts per day as compared to one shift. Typically, equipment life is indicated by the manufacturer in terms of hours of operation instead of years of service to take into account multiple shift operations.

For purposes of the cost analysis, it is assumed that all costs and revenue related to operation of the MRF would be split on a percentage based on the total tonnage provided by each entity. The City of Milwaukee, Waukesha County, and City of Wauwatosa would be 44 percent, 44 percent, and 12 percent respectively, for their share of the costs and revenues.

² Note: Footnote #2 information is included in Appendix G.

If the City of Milwaukee were to partner with Waukesha County and City of Wauwatosa and build a MRF somewhere other than at the existing City MRF then the additional cost of a building and the cost of site improvements would be required. The cost of land was not considered in the 2007 Waukesha Study because the study addressed using the City of Wauwatosa property. The Waukesha County Study estimates the cost of the building to be \$3,500,000 and the cost of site improvements to be \$750,000.³ When these two numbers are added and adjusted for current dollars the total cost for a facility's building and site improvements is \$4,427,000. The 2007 Waukesha Study numbers are assumed to be on the low side based on recently built MRFs. From the 2007 Waukesha County Study, a ratio of dual-stream equipment cost/single-stream equipment cost was calculated to be 88 percent ($\$3,500,000/\$4,000,000$).⁴ Using this scale up factor of 88 percent, a cost of \$5,000,000 appears more realistic ($\$4,427,000/0.88$). As a final check, this figure is compared to the building costs for the similarly sized facility that was constructed in Kent County Michigan. The costs for the building and site improvements for that Kent County Michigan facility were \$6,388,000 (see Appendix G).

Taking all of these different numbers into consideration, and factoring in their own historical data AECOM will use a cost of \$6,000,000 for the building and site improvements for the cost analysis. This is aside from the process equipment costs listed in Table 3.

For the Optimal MRF site, AECOM contacted a local real estate broker to inquire into the approximate cost for a 5-acre parcel in the New Berlin Industrial Park. He indicated that the property would cost about \$150,000 to \$200,000 per acre. For our evaluation, we will use \$200,000 per acre. In addition, he indicated that he is not aware of an undeveloped parcel in this industrial park of that size. He suggested other properties further away would be available at probably a lower cost, but would be a greater travel distance. Another option is an existing structure in the industrial park meeting the size requirements of the MRF.

4.2.4 MRF Operation and Maintenance

Operation and Maintenance of a Single-Stream Recycling Facility

The 2007 Waukesha County Study estimates the annual cost of operation and maintenance of a single stream facility to be \$44.02/ton (2010 dollars) for a 30,000 ton per year system and \$36.70/ton (2010 dollars) for an 80,000 ton per year system.⁵

There is limited detail in the 2007 Waukesha County Study as to what went into the development of these costs. General rules of thumb suggest that it costs approximately \$50.00/ton to operate a large volume single stream facility which is also in the same range of costs. A third party contract can be quite variable in its processing fee depending upon if they also receive a portion of the recyclables revenue.

City of Milwaukee MRF Operation and Maintenance Costs

The O&M cost is largely dependent on the system selected (the level of automation), the cost of local labor and a variety of other factors. The City of Milwaukee MRF has historically contracted all of the Operation and Maintenance of their existing MRF to a third party for a negotiated rate per ton. For purposes of the Cost analysis in this report, AECOM will assume that the regional MRF will continue to contract this service.

The O&M cost that AECOM used for the cost scenario is presented in Table 4.

³ Note: Footnote #6 information is included in Appendix G.

⁴ Note: Footnote #4 information is included in Appendix G.

⁵ Note: Footnote #7 information is included in Appendix G.

AECOM's estimates for O&M are in line with data presented in the AECOM Recycling Facility Study that was presented in October of 2008. The 2007 Waukesha County Study and the City of Milwaukee's own data confirm that these are reasonable estimates.

4.2.5 MRF Revenue

The City of Milwaukee's contract with WMRA for processing recyclables is based on the current market rate for the processed material, and the current negotiated O&M cost. There is also an adjustment to deduct the volume of mixed residue waste but for purposes of this report the mixed residue waste is assumed to be factored out in the recovery rate.

The simplified formula for calculating the recycling revenue for MRF in the cost analysis is as follows:

$$[(\text{Recycled Material Market Price per ton}) / 2 - (\text{MRF O\&M Cost per ton})] \times (\text{Pick-Up Schedule Volume in tons})$$

Where:

- Recycled Material Market Price = Current market price per ton for sellable materials recovered at the MRF
- Pick-Up Schedule Volume = Volume of Recyclables picked up and brought to the facility for each collection scenario
- MRF O&M Cost = Operation and Maintenance Cost of the MRF (see Section 4.2.4)

A positive result in this revenue formula represents an income to the regional MRF and a negative result in this formula represents a cost to the regional MRF.

Recycled Material Market Price

The 2007 Waukesha County Study estimates median net revenue of \$77.78 per ton. This number is based on data compiled by the County over 10 years from 1991 to 2006.⁶ It should be noted that this data is several years old and market conditions are constantly changing.

In order to determine the Recycled Material Market Price, AECOM will use a figure that is based on revenues listed in the monthly contract reports from WMRA to the City of Milwaukee. The determination of this figure is based on data presented in Table 5.

The recycling market is based on a global economy. The recent down turn in the economy directly impacts the recycling revenue. The long-term forecast is for an improved economy and a return to higher values for recyclables.

\$90.00 per ton will be used as the Recycled Material Market Price for the "LOW Cost" scenarios.

\$110.00 per ton will be used as the Recycled Material Market Price for the "HIGH Cost" scenarios.

In the City of Milwaukee Recycling Facility Alternatives Study, AECOM addressed recycled material market price on the low and high end to bracket the costs and revenues. The ranking of the facility alternatives were unchanged by the bracketed material market price. For this reason, an average market price will be used in this study of transportation alternatives. The estimated tonnage will be given in a range for each governmental unit.

⁶ Note: Footnote #8 information is included in Appendix G.

4.2.6 Modifications to Existing City of Milwaukee MRF

Existing City of Milwaukee MRF Demolition

The existing City of Milwaukee MRF dual stream processing equipment would be removed if the existing MRF is used in a particular cost scenario. Some of the equipment may have some salvage value, and the equipment does have a scrap value, however the current price of scrap steel is relatively low. A cost of \$250,000 is included for the demolition of the equipment. This cost assumes that any salvage/scrap value for the equipment will go to the demolition contractor as part of the \$250,000 estimate. If there is salvageable equipment (with a salvage value associated with it) this could lower the \$250,000 cost estimate. A cost of \$100,000 is also included for some facility upgrades to the existing MRF structure. These are assumed to be the cost of some minor structural, floor, utility, and miscellaneous repairs following equipment demolition.

AECOM estimates that it will cost \$250,000 to demolish the equipment at the existing City MRF. The estimated costs to modify the existing MRF are presented in Table 7. The useful life of the new facility is estimated to be 15 years before major upgrades would need to be made.

4.2.7 Modifications to the Existing Waukesha County MRF

The Waukesha County MRF would have the process equipment removed.

The existing Waukesha County MRF processing equipment would be removed if the existing MRF is used in a particular cost scenario. Some of the equipment may have some salvage value, and the equipment does have a scrap value, however the current price of scrap steel is relatively low. A cost of \$250,000 is included for the demolition of the equipment. This cost assumes that any salvage/scrap value for the equipment will go to the demolition contractor as part of the \$250,000 estimate. If there is salvageable equipment (with a salvage value associated with it) this could lower the \$250,000 cost estimate. A cost of \$100,000 is also included for some facility upgrades if the existing MRF structure is continued to be used as a recycling transfer station (Alternative B). These are assumed to be the cost of some minor structural, floor, utility, and miscellaneous repairs following process equipment removal.

Some alternatives consider no longer using the Waukesha County MRF. In these cases the existing MRF may also be demolished. The demolition cost of the MRF is not included in any of the alternatives because the future use of the existing MRF in these scenarios has not been determined.

AECOM estimates that it will cost \$250,000 to demolish the equipment at the existing Waukesha County MRF. The estimated costs to modify the existing MRF are presented in Table 7. The useful life of the new facility is estimated to be 15 years before major upgrades would need to be made.

4.2.8 Recyclables Transfer Station Equipment

For purposes of this report, AECOM will use the figures presented in Table 6 for estimating the cost of an installed/delivered piece of equipment.

4.2.9 Transfer Facility Cost

In developing an estimate for the costs associated with constructing a Transfer Facility (TF):

- Constructing a Transfer Facility at the existing Waukesha County MRF which includes the cost of modifying the existing building. This is referred to as the Existing MRF Transfer Facility Scenario.

The following assumptions were made:

- The cost of land was not considered. The new Transfer Facility is located on property that the County already owns.
- The facility will need to have the following features:
 - Site improvements (paving, drainage, fencing, etc.)
 - Building with tipping floor and multiple truck bays
 - 1 compactor
 - 1 scale
 - 1 yard truck
 - 1 end-loader
 - 1 semi tractor
 - Parking for 3 compacted waste hauling trailers and semi tractor
 - Truck scale auto scanner, cameras for unattended scale operation

Some of these features already exist at the location. The current cost estimate is meant to be on the conservative side. A cost for a feature will be included if the feature does not currently exist.

AECOM will use the figures presented in Table 7 for estimating the construction costs and Table 6 for estimating the equipment costs of a new Transfer Facility located at the existing Waukesha County MRF location.

4.2.10 Recyclables Transfer Facility Operation and Maintenance

Waukesha County currently contracts the O&M of their MRF to a third party, so it is assumed that they would do the same for a new Recyclables Transfer Facility. It is also assumed that the O&M cost would include transfer station operation, maintenance, utilities, and the cost of transportation to the MRF.

The O&M cost that AECOM used for the Transfer Facility is presented in Table 8.

The transfer station O&M rate is estimated in Appendix B and includes transfer station equipment, labor, fuel, utilities, and related expenses. The number of loads per year is estimated based on the projected number of recycling trucks using the transfer station. A preliminary review of the transportation routes indicates approximately 80 percent of the Waukesha County service area would use the transfer station. The remaining 20 percent of the recycling trucks would travel directly to the Milwaukee MRF. The decision on whether to use the Waukesha transfer station or to travel directly to the Milwaukee MRF was based on the travel time for each scenario. The shortest travel time dictated the decision on which routes went directly to the Milwaukee MRF. The routes along the east side of Waukesha County were most likely to travel directly to the Milwaukee MRF.

AECOM's estimates for O&M are in line with data presented in the AECOM Recycling Facility Study that was presented in October of 2008. The 2008 Study evaluated a transfer station with semi-trucks traveling from the City MRF to the WMRA MRF in Germantown, which has similar distance and travel time from the Waukesha County MRF to the City MRF. The transfer station O&M cost is derived from calculations presented in Appendix B.

4.2.11 Facility and Equipment Life Expectancy

Buildings and grounds are generally expected to last 40 to 50 years.⁷

Process equipment with routine maintenance and service can last for many years. The waste recycling industry relies heavily on material handling equipment. A reasonable estimate for the life expectancy of

⁷ Note: Footnote #9 information is included in Appendix G.

material handling equipment is 10 to 15 years. This is also true for motors, controls, starters, and most electrical equipment.⁸

Recycling commodities may change due to packaging, consumer trends, etc., it is reasonable to assume that in 15 years there will also be the need to change most of the equipment to adapt to the changing times.

The equipment and building at the transfer facility are subjected to more severe service. As such, they have shorter life expectancies.

AECOM will use the figures presented in Table 9 for estimating the useful life of a particular piece of equipment.

Based on all of the information presented above, the life cycle of a transfer station or a MRF will be evaluated for 15 years. This coincides with the assumptions in the 2007 Waukesha County Study.⁹ The salvage value of a new building (Alternative C – Optimal MRF Site) will be assumed to be 50 percent of its original cost.

4.2.12 Transportation Cost Estimates

The transportation costs consist of collection and transport of recyclables. Transport costs are included for taking compacted loads of recyclables from the former Waukesha County MRF which would be converted to a transfer station and traveling to the City of Milwaukee MRF (Alternative B). All the other alternatives consider using the recycling trucks to travel to the regional MRF.

The collection of recyclables is common to all alternatives and is therefore excluded from the cost analysis. The travel distance from the centroid of the collection route to the regional MRF, or to the Waukesha County transfer station and then to the City of Milwaukee MRF (Alternative B) was evaluated on a round trip basis.

The cost analysis was done based on the route calculated by on-line mapping software such as Google Maps or MapQuest. One-way distances and times were calculated for each sector to the destination such as the Waukesha County transfer station or regional MRF.

A recycling route was chosen to determine if Google Maps provided a comparable answer to MapQuest. The results were comparable.

It was assumed that the time and mileage within a sector would remain the same for collection of recyclables. Therefore, only the routes to the sectors from the existing and proposed facilities were analyzed. The Google Maps time was increased by 20 percent to account for a truck rather than a car time. The time to dump the recyclables at the MRF was considered common to alternatives and therefore is eliminated from the assessment. Additional discussion of routing for Wauwatosa is provided in Section 6.0, Discussion of Results. The labor and maintenance/fuel costs were provided by the City of Milwaukee and are provided in Appendix H. The City of Wauwatosa and Waukesha County have a private hauler perform recyclables collection and, therefore, the City of Milwaukee labor and maintenance/fuel costs are used which should reflect the local conditions.

- Labor – Operations Driver Worker: \$46.58/hour
- Maintenance/Fuel – Recycling Packer: \$11.20/hour
- Fuel Price - \$4.00/gallon

These costs were converted as follows:

⁸ Note: Footnote #9 and #10 information is included in Appendix G.

⁹ Note: Footnote #11 information is included in Appendix G.

- Labor: \$0.78/minute
- Maintenance/Fuel: \$0.19/minute

The labor and maintenance/fuel costs are therefore \$0.97 per minute combined. The number of trips per month, minutes per trip, and cost per minute were used to calculate a monthly cost per sector. The annual cost per sector was summed to obtain the present annual cost for each alternative.

The transportation cost estimates for Waukesha County are provided in Appendices A, B, and C for the various alternatives. The transportation cost estimates for the City of Wauwatosa for the two other alternatives are provided in Appendices D and E.

The Waukesha County area served by Veolia is currently providing dual stream collection once per week. In the next year or so, Veolia will begin collecting single-stream recyclables on an every other week basis. Lyle Paulin of Veolia indicated the conversion of recycling equipment to collect the recyclables will be done over time to bring new equipment on line. He indicated these collection trucks have a 10-year life, approximately. More packer-type trucks will be incorporated to increase the density of material in the truck which increases the payload. The scooters currently used to collect recyclables will be phased out because the associated trucks are unable to pack the recyclables resulting in a lower density of recyclables in the truck.

Waukesha County anticipates a 25 percent increase in recyclables when the conversion to single stream is implemented. Bill Kappel of the City of Wauwatosa found an 18 to 20 percent increase in recyclables after changing from dual to single-stream collection. Lyle Paulin of Veolia indicated a 15 to 20 percent increase in recyclables can be expected with the switch to single-stream. The 25 percent increase should be on the conservative side for estimating transportation costs.

A review of the Veolia recyclables hauling records found over 80 percent of the trucks had only a partial load and could have accepted 50 to 75 percent additional recyclables to fill the trucks. The other alternatives could be expected to have similar figures. This implies if more recyclables are obtained with a single-stream collection, there could be space available in the truck to accommodate the additional material without significantly increasing the number of trips.

In summary, the following recycling collection activities will take place within the next year or so:

- Single-stream recycling will replace dual-stream.
- An increase from 15 to 25 percent in recyclables is expected to occur with single-stream.
- More efficient recycling trucks with a larger payload will be phased into the fleet over the next 10 years.
- Collection will change from weekly to every 2 weeks.
- Results from the tabulation of recycling routes indicate the majority of recycling trucks are transporting less than a full load and space is available to accommodate increased recyclables due to single-stream collection.

Based on this information, this study will evaluate recycling transportation as follows:

1. The current dual-stream collection trips will be used for computing the number of truck trips based on the current weekly operation.
2. Increased tonnage with single-stream collection will be accommodated by the large number of trucks currently traveling with partial loads.
3. More efficient collection trucks will be phased in over time and have a larger payload to better handle the increased tonnage.

4. The projected number of truck trips will be based on the current weekly collection, but will actually occur every other week in the near future.
5. The transportation tables contained in Appendices A, B, and C for Waukesha County include a column to increase the truck load by 25 percent to reflect the increased volume with single-stream collection.

Table 10 provides the Waukesha County Transportation Summary by community. The current tonnage is based on Veolia's estimate of loads and Veolia estimated about 4 tons per truck capacity. The current tonnage was increased 25 percent to determine the projected tonnage when single-stream collection is implemented. The projected number of truck trips per event is estimated and based on weekly collection. When single-stream collection is implemented every 2 weeks, the projected number of truck trips per event will double, but the total truck trips per year will be about the same. The annual truck trip total is 52 weeks times the truck trip events indicated in Table 10.

The estimated tonnage for the current collection of Waukesha County is 25,900 tons per year. The projected tonnage when adding the 25 percent for single-stream collection is about 32,400 tons per year.

The travel times from the collection routes to each destination including the Milwaukee MRF, Waukesha Transfer Station, and the Optimal MRF site are provided in each Appendix including A, B, and C for the alternatives.

4.3 Present Worth Analysis

A present worth analysis was performed to determine the project costs for the recycling transportation alternatives. The present worth is the theoretical amount of money needed to cover capital, operations and maintenance, and transportation costs over the term of the project. It is based on investing the money today at a certain interest rate to cover all costs over the project term.

For this project, a 15-year term is proposed to reflect the useful life of new processing equipment at the MRF. An annual interest of 3.5 percent is used.

Present Worth Analysis:

- Capital cost will be figured at the beginning of the period.
- Annual costs will be calculated using uniform present worth calculation.
- The "Salvage Value Cost" portion of the equation will only be used in scenarios where a new facility is required

$$P = (\text{Capital Cost}) + \left[A \times \frac{(1+i)^n - 1}{i(1+i)^n} \right] + D(1+i)^{-n}$$

Where:

P	=	Present worth (negative number is a cost; positive number is an income)
Capital Cost	=	Sum of the capital cost (negative number)
A	=	Sum of the annual income and annual costs (income is added; costs are subtracted)
D	=	Sum of the salvage values at the end of the period (positive number)
i	=	Annual interest rate (3.5%) or (0.035)
n	=	Period (15 years)

The uniform present worth factor for annual costs is:

$$\frac{(1 + (0.035))^{15} - 1}{(0.035)(1 + (0.035))^{15}} = 11.52$$

The present worth factor for the salvage value is:

$$(1 + (0.035))^{-15} = 0.597$$

5.0 COST ANALYSIS

The cost analysis for the respective alternatives is included in these appendices:

	<u>Alternative</u>	<u>Appendix</u>
A	Milwaukee MRF Using Recycling Trucks	A
B	Transfer Station in Waukesha Haul to Milwaukee MRF	B
C	Haul to Optimal MRF Site	C
D	Wauwatosa Hauls to Milwaukee MRF	D
E	Wauwatosa Hauls to Optimal MRF Site	E

6.0 DISCUSSION OF RESULTS

Table 11 is a cost comparison of recycling transportation alternatives addressing a design recycling tonnage and an estimated recycling revenue. The table includes capital, operation and maintenance, transportation, and total present worth costs. The following is a discussion of the alternatives addressing monetary and non-monetary considerations.

The representative costs are shown as a negative number. Revenue from recyclables is a positive number. Therefore, the alternative with the largest positive number is the most cost-effective solution for Waukesha County or City of Wauwatosa.

Salvage values of new facilities were incorporated into the analysis for Alternatives C and E. Salvage values are the worth of a structure or process equipment at the end of a cost analysis period and converted to a present worth. Based on a 15-year life, processing equipment would have nearly zero salvage value. Structures would have about 50 percent value based on a 30-year life.

For Waukesha County, Alternative A – Milwaukee MRF Using Recycling Trucks is the most cost-effective because it has the best total present worth value and lowest capital cost.

For the City of Wauwatosa, Alternative D – Wauwatosa Hauls to Milwaukee MRF is the most cost-effective because it has the least capital cost.

The analysis considers revenue sharing at 50:50 between the third party and the three governmental units. The 50:50 split is based on the City of Milwaukee's and Waukesha County's current agreement with third parties and this split can vary with contracts.

The cost allocation is based on recyclables tonnage with the City of Milwaukee contributing 44 percent, Waukesha County contributing 44 percent, and City of Wauwatosa contributing 12 percent.

From the present worth analysis, several trends can be seen. The alternative with the least capital cost tends to be the most cost-effective alternative. The annual operating and maintenance costs for the alternatives tend to be similar figures for each case and, therefore, are not a significant differentiation. The total hauling costs represent a substantial percent of the total present worth costs for Waukesha County alternatives. The annual hauling cost is multiplied by 11.52 to obtain the present worth. For

example, a \$600,000 annual hauling cost represents nearly \$7 million in present worth. The annual income from the sale of recyclables is consistent with all alternatives and, therefore, is not a differentiator.

For the City of Wauwatosa, both Alternatives D and E are similar except Alternative D – Wauwatosa Hauls to Milwaukee MRF, has the least capital cost which is the primary differentiator which results in this alternative being the most cost-effective. Hauling costs are relatively low for either alternative and are very similar with either option.

Alternative A – Milwaukee MRF Using Recycling Trucks

Waukesha County recycling trucks would travel directly to the City of Milwaukee MRF. This option has the lowest capital costs, but has a higher transportation cost than the other Waukesha County related alternatives. The Milwaukee MRF has a lower capital cost than the Optimal MRF site because the land is already City of Milwaukee owned, and the structure and most of the infrastructure is already in place.

Alternative B – Transfer Station in Waukesha, Haul to Milwaukee MRF

Waukesha County recycling trucks would travel to the existing Waukesha MRF, which would be converted into a recyclables transfer station. Recyclables would be compacted and transferred to the Milwaukee MRF using semi-trucks.

Communities along the eastern side of Waukesha County would have their recycling trucks travel directly to the Milwaukee MRF instead of the Waukesha transfer station.

This alternative reduces Waukesha County transportation costs, but adds the cost for a transfer station.

The Waukesha County transfer station would have one front-end loader operator as the only labor. The scale would be upgraded to include a bar code system for reading truck information, intercom, security cameras, and related features for an unattended scale operation. This improvement would pay for itself in 1 year as compared to adding a scale operator. The scale would only accept commercial trucks equipped with the bar code system.

Travel times on I-94 from Waukesha to the Milwaukee MRF can be influenced by the time of day. Traffic congestion can be expected during morning and evening rush hours. The transfer station alternative minimizes the travel to the Milwaukee MRF which is a benefit to Waukesha County as compared to Alternative A – Milwaukee MRF Using Recycling Trucks. If the transportation to the Milwaukee MRF can be done during times outside the morning and afternoon rush hours, it would be advantageous to Waukesha County.

[ADD DISCUSSION ON I-94 TRAVEL TIMES. WAITING FOR DOT TRAFFIC OPERATIONS CENTER. THEY ARE REVIEWING HISTORICAL INFORMATION TO DETERMINE IF THEY CAN PROVIDE HISTORICAL AVERAGE TRAVEL TIMES LINKED TO TIME OF DAY FOR MOORLAND ROAD TO DOWNTOWN.]

Alternative C – Haul to Optimal MRF Site

This alternative reduces the transportation costs for Waukesha County compared to Alternative A traveling to Milwaukee. The higher capital cost for the Optimal MRF site is due to the land purchase, new MRF construction, and associated infrastructure.

Alternative D – Wauwatosa Hauls to Milwaukee MRF

This alternative has an overall lower capital cost for the Milwaukee MRF as compared to the Optimal MRF site. The transportation costs for the City of Wauwatosa to either the Milwaukee MRF or Optimal MRF site are relatively similar. AECOM evaluated transportation routes from Wauwatosa to the Milwaukee MRF using either the Interstate or City streets. The Interstate route using MapQuest considered this route to be significantly faster, but when recycling trucks are traveling on the Interstate at 3:30 p.m., traffic delays can be expected, thereby reducing the time savings compared to City streets. AECOM used the more conservative estimated times using the City streets for this evaluation.

Alternative E – Wauwatosa Hauls to Optimal MRF Site

This alternative has a similar transportation cost as Alternative D, but has an overall higher capital cost due to the new Optimal MRF site option which includes land purchase, a new MRF, and associated infrastructure.

Other Potential Alternatives

There are a variety of other recycling alternatives which could be considered including:

- Other MRF site locations.
- Regional MRF serving additional governmental units or a third party.
- Third party MRF.

One other MRF site location could be the Wauwatosa Public Works property, thereby eliminating the land purchase with the Optimal MRF site. This option would be somewhat farther for Waukesha County than the Optimal MRF site.

The MRF could serve Waukesha County, City of Wauwatosa, and City of Milwaukee or more communities or a third party. There are definitely economies of scale, but sometimes local issues may reduce the likelihood of a multiple-party agreement.

A third party MRF such as the WMRA facility in Germantown is a viable option and has capacity available. To improve the governmental units' bargaining power, a joint bidding process combining all three governments could be more advantageous than three separate smaller volume contracts.

These other potential alternatives are outside the scope of this study, but can be further evaluated upon request. In the future, other regional MRF operations may develop and be cost-effective options for Southeastern Wisconsin. Brown County, Outagamie County, and Winnebago County recently constructed a new MRF serving the Fox Valley.

7.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

7.1 Summary

Waukesha County is under contract with FCR to operate their MRF. County recyclables are collected by Veolia Environmental Services for the County's service area. John's Disposal collects recyclables for the Villages of Eagle and Big Bend. The City of Wauwatosa is served by WMRA for recyclables collection and the recyclables are processed by WMRA at their MRF in Germantown.

The City of Milwaukee is interested in exploring a regional MRF located in Milwaukee and serving the City of Milwaukee, Waukesha County, and City of Wauwatosa. Waukesha County and the City of Wauwatosa are likewise interested in potential regional MRF alternatives and requested AECOM to evaluate transportation costs for recycling options.

The following recycling transportation alternatives were evaluated:

- Alternative A – Milwaukee MRF Using Recycling Trucks
- Alternative B – Transfer Station in Waukesha, Haul to Milwaukee MRF
- Alternative C – Haul to Optimal MRF Site
- Alternative D – Wauwatosa Hauls to Milwaukee MRF
- Alternative E – Wauwatosa Hauls to Optimal MRF Site

The recyclables would be picked up every 2 weeks, using single-stream collection.

The allocation of costs is based on Waukesha County 44 percent, City of Milwaukee 44 percent, and City of Wauwatosa at 12 percent. These ratios are estimated from recyclable tonnages for the respective governmental units.

7.2 Conclusions

Based on the findings in this study, the following conclusions are made:

4. **Alternative A – Milwaukee MRF Using Recycling Trucks** is the most cost-effective option for Waukesha County. This alternative has the lowest capital cost and highest total present worth revenue for the County. This alternative likewise would benefit the City of Milwaukee and City of Wauwatosa.
5. **Alternative D – Wauwatosa Hauls to Milwaukee MRF** is the most cost-effective option for the City of Wauwatosa. This alternative likewise would benefit the City of Milwaukee and Waukesha County in developing a regional MRF.
6. The **Optimal MRF Site** alternatives have the highest capital cost due to the land purchase and large investment to construct a new MRF.

7.3 Recommendations

The following recommendations are made:

4. Continue negotiations among Waukesha County, City of Wauwatosa, and City of Milwaukee to further explore Alternative A – Milwaukee MRF Using Recycling Trucks for Waukesha County, and Alternative D – Wauwatosa Hauls to Milwaukee MRF.
5. If a regional MRF in Milwaukee cannot be implemented due to costs or non-monetary reasons such as governmental issues, consider a joint arrangement among Waukesha County, City of Milwaukee, and City of Wauwatosa to pool resources to bid out recycling processing to improve the bargaining power through a larger recycling volume, if a third party MRF is being considered.
6. If the regional MRF in Milwaukee cannot be implemented, further explore the other recycling alternatives identified in this study.

TABLES

Table 1
Estimated Recyclables Tonnages

Scenario	Waukesha Study* (tons/year)	Current Estimates ** (tons/year)	Projected Volumes (tons/year)***
City of Milwaukee only	28,354 – 29,015	23,000	23,000 - 27,000
City of Milwaukee, City of Wauwatosa, Waukesha County (County)	76,000 – 80,817	52,000	52,000 - 60,000
NOTES: * Waukesha study reference information is included in Appendix G. ** Based on Waukesha County presentation, July 27, 2009. Presentation reference information is included in Appendix G. *** Projected volumes used in this report's cost analysis			

Table 2
Capital Equipment Information

Information Source	System Size	Cost
<u>RRT Design and Construction</u> Waukesha County Study Prices adjusted for inflation and presented in 2009 dollars. ^{5,6}	30,000 TPY	\$4,161,000
<u>Van Dyk Baler Corporation</u> Van Dyk Baler is the distributor for Bollegraff turnkey systems.	30,000 TPY 80,000 TPY*	did not respond
<u>Bulk Handling Systems</u> Bulk Handling Systems provides turnkey systems	30,000 TPY 80,000 TPY*	did not respond
<u>JWR Incorporated</u> JWR Inc. Jerry Flickinger Equipment Sales Manager	30,000 TPY 80,000 TPY*	\$6,000,000 – \$7,000,000
<u>Kent County, Michigan</u> Calvin Brinks Purchasing Supervisor Kent County Purchasing Division provided public information about their recently awarded contracts for construction. The facilities' equipment was designed and installed by RRT Design and Construction	15 -18 TPH or 30,000 - 36,000 TPY	\$5,205,000
<u>Outagamie County, Wisconsin</u> Jill Haygood Outagamie County provided public information about their recently constructed facility. The facilities' equipment was designed and installed by Bulk Handling Systems	25 TPH or 50,000 TPY*	\$7,700,000
NOTES: 1. Footnote Nos. 5 and 6 information is included in Appendix G. * Based on one 8-hour shift per day.		

Table 3
Estimated Capital Equipment Costs

Commodity	30,000 tons/year (14 tons/hr)	80,000 tons/year (38 tons/hr)
Process Equipment	\$5,200,000	\$7,700,000
Engineering Design and Construction Services (12%)	\$624,000	\$924,000
Contingency (15%)	\$780,000	\$1,155,000
Subtotal	\$6,604,000	\$9,799,000
Administrative Costs (3%)	\$198,000	\$293,000
Total	\$6,802,000	\$10,092,000
NOTES:		
Tons/hr based on one 8-hour shift per day.		

Table 4
Estimated MRF O&M Cost

Cost Scenario	O&M Rate (\$/ton)	Source
Single-Stream Processing	\$46.00	AECOM scaled up factor from current City of Milwaukee rate of \$41.94/ ton*
NOTES: * Processing cost rate of \$41.94/ton was based on a phone conversation with the City of Milwaukee Recycling Manager on 8-17-09. AECOM increased the rate because more people and equipment will be required to operate a Single Stream MRF, resulting in a higher O&M cost per ton.		

Table 5
Recycled Material Market Prices

Year	Revenue Per Ton ¹ (\$/ton)	Average Revenue Per Ton* (\$/ton)
2003	\$74.97	\$74.97
2004	\$95.43	\$85.20
2005	\$96.80	\$89.07
2006	\$88.61	\$88.95
2007	\$108.56	\$92.87
2008	\$116.58	\$96.82
2009	\$46.69	\$89.66
2010**	\$91.07**	\$89.84
<p>NOTES:</p> <p>1. Footnote #9 information is included in Appendix G.</p> <p>* Sum of the current + previous year(s) revenue / total number of years.</p> <p>** First quarter only, City of Milwaukee figure.</p>		

Table 6
Recyclables Transfer Station Equipment Estimated Costs

Commodity*	Cost/unit	Source
Compactor	\$150,000	Stepp Equipment Corporation
Transfer Trailers	\$110,000	Stepp Equipment Corporation
Semi Tractor	\$100,000	AECOM Recycling Facility Study
Yard Truck	\$100,000	AECOM Recycling Facility Study
Front-End Loader	\$350,000	AECOM Recycling Facility Study
Truck Scale Auto Scanner	\$60,000	TSW Automation
NOTES:		
* Waukesha County is not likely to purchase this equipment. There is the option that all of the equipment will be provided by a third party as part of a design/build/operate scenario. For the purposes of this study, it is assumed that this equipment is purchased by Waukesha County.		

Table 7
Recyclables Transfer Station Building Estimated Costs

Commodity	Cost	Source
Building Improvements for compactor installation	\$100,000	AECOM Estimate
Engineering /Design and Construction Services	\$12,000	12% of cost
Contingency	\$15,000	15%
Subtotal	\$127,000	
Administrative Costs	\$4,000	estimated at 3%
Total	\$131,000	

Table 8
Recyclables Transfer Facility Estimated O&M Costs

Cost Scenario	O&M Rate (\$/ton)	Source
Transfer Facility Operations	\$13.00	\$13.00/ton for transportation to MRF and transfer station O&M

Table 9
Building and Equipment Life Expectancy

Commodity	Life Expectancy	Source
Buildings and Grounds	30 years	EPA publication EPA 816-R-03-016 September 2003
Single-Stream Process Equipment	10 to 15 years	AECOM/ Waukesha Study/JWR Incorporated
Compactor	10 years	Stepp Equipment Corporation
Yard Truck	15 years	AECOM / Stepp Equipment Corporation
Front-End Loader	15 years	AECOM / Stepp Equipment Corporation

Table 10
Waukesha County Transportation Summary

Community	Projected Tonnage Estimate	Projected Number of Truck Trips/Event
City of New Berlin	69.8	18
Town of Lisbon	27.4	7
Town of Delafield	23.7	6
Village of Dousman	5	2
City of Brookfield	104.7	27
Village of Elm Grove	18.6	5
City of Waukesha	130.8	33
City of Pewaukee	31.2	8
City of Delafield	15.5	4
Village of Hartland	20	5
City of Oconomowoc	32.5	9
Town of Waukesha	20	5
Village of Wales	7.5	2
Village of Merton	6.2	2
Town of Merton	19.4	5
Village of Nashotah	3.1	1
Town of Brookfield	16.2	5
Town of Oconomowoc	18.7	5
Village of Lac LaBelle	10	3
Town of Summit	12.4	4
Village of Oconomowoc Lake	3.1	1
Village of Pewaukee	15	4
Village of Chenequa	2.5	1
Village of Eagle	5	2
Village of Big Bend	5	2
TOTAL	623.3	166
Estimated Annual Tonnage:		
Current:	25,900	
Projected:	32,400	
Projected Annual Truck Trips:	8,632	
Notes:		
<ol style="list-style-type: none"> Projected tonnage is the current tonnage plus a 25 percent increase when converting to single-stream collection. Current tonnage is based on Veolia's estimate for loads. Projected tonnage was divided by 4 tons/truck to determine number of truck trips based on Veolia's estimates. Total tonnage figures are approximations. Projected number of truck trips is based on projected tonnages. Current truck trips is weekly collection, and will be every 2 weeks within about a year. Estimated truck trips should be conservative because single-stream collection and new trucks will be phased in over the next several years to increase efficiency. Multiply projected number of truck trips per event by 52 to determine annual truck trips. When single-stream collection is implemented, collection will occur every other week. The end result is the number of truck trips per year will be about the same as the present situation. 		

Table 11

Cost Summary for Each Alternative

Costs/Income	Alternative				
	Waukesha County			City of Wauwatosa	
	A	B	C	D	E
Total Capital Costs	-\$3,102,880	-\$3,583,880	-\$6,072,880	-\$846,240	-\$1,656,240
Total Annual Operating and Maintenance Costs	-\$1,052,480	-\$1,290,432	-\$1,052,480	-\$287,040	-\$287,040
Total Hauling Costs	-\$644,000	-\$418,000	-\$468,000	-\$12,000	-\$11,000
Total Annual Income	\$2,288,000	\$2,288,000	\$2,288,000	\$624,000	\$624,000
<u>Present Worth</u>					
Present Worth - Capital Costs	-\$3,100,000	-\$3,580,000	-\$6,070,000	-\$850,000	-\$1,660,000
Present Worth - Annual Costs	-\$15,450,000	-\$15,560,000	-\$13,850,000	-\$2,720,000	-\$2,720,000
Present Worth - Annual Income	\$20,840,000	\$20,840,000	\$20,840,000	\$5,680,000	\$5,680,000
Present Worth - Salvage Value of New Facility	NA	NA	\$480,000	NA	\$130,000
Total Present Worth	\$2,290,000	\$1,700,000	\$1,400,000	\$2,110,000	\$1,430,000

Notes:

1. Table values based on lower range of recyclable volume.
2. Positive present worth indicates income/profit, negative present worth indicates cost.
3. Present worth is based on a 15 year period.

Alternative A - Milwaukee MRF Using Recycling Trucks

Alternative B - Transfer Station in Waukesha Haul to Milwaukee MRF

Alternative C - Haul to Optimal MRF Site

Alternative D - Wauwatosa Hauls to Milwaukee MRF

Alternative E - Wauwatosa Hauls to Optimal MRF Site

APPENDICES

Appendix A

Alternative A - Milwaukee MRF Using Recycling Trucks

Appendix A, Table 1
Alternative A - Milwaukee MRF Using Recycling Trucks

	Total	Waukesha County
Portion of total ¹	100%	44%
<u>Milwaukee MRF Capital Costs</u>		
Cost to demolish equipment and modify existing MRF	-\$250,000	-\$110,000
Single Stream Processing Equipment	-\$6,802,000	-\$2,992,880
Total Capital Costs	-\$7,052,000	-\$3,102,880
<u>Milwaukee MRF Annual Costs</u>		
Operating and Maintenance Costs = \$46/ton		
Estimated Annual recyclables volume ¹ (tons)	52,000 to 60,000	22,880 to 26,400
Operating and Maintenance Costs	-\$2,392,000 to -\$2,760,000	-\$1,052,480 to -\$1,214,400
<u>Annual Hauling Costs</u>		
Hauling to Milwaukee MRF (recycling trucks)	NA	-644,000
<u>Annual Income</u>		
Average Anticipated Recycled Material Price ² = \$100/ton		
Annual Recyclable Income	\$5,200,000 to \$6,000,000	\$2,288,000 to \$2,640,000
<u>Present Worth³</u>		
See calculation page for Uniform Present Worth Factor (UPWF), UPWF = 9.11		
Present Worth - Capital Costs	NA	-\$3,100,000
Present Worth - Annual Costs	NA	-\$15,450,000 to -16,930,000
Present Worth - Annual Income	NA	20,840,000 to 24,050,000
Total Present Worth	NA	\$2,290,000 to \$4,020,000
<u>Notes</u>		
1. Estimated annual recyclables volume and portion attributed to each municipality are discussed in Section 4.2.		
2. Average anticipated recycled material price based on the low, \$90/ton, and high, \$110/ton. Prices are discussed in Section 4.2.5.		
3. Present worth = $(((UPWF) \times (Annual\ Income - Annual\ Costs)) - Capital\ Costs)$, a positive number indicates profit, a negative number indicates cost.		

Appendix A - Table 2 - Transportation Cost Analysis
Alternative A - Milwaukee MRF Using Recycling Trucks

To and From a Milwaukee MRF at 1300 Mt. Vernon Road																	
Day	Routes	Municipality	Distance				Time				Cost ¹						
			(miles)		(minutes)		(minutes)		Labor per trip	Maint/Fuel per trip	Total cost per trip	Trips			Monthly Cost ³	Annual Cost ³	
			one- way	round- trip	one- way	round- trip	20% Inflated truck time	Current Truckloads/ Day				25% Increased Truckloads	Route Tonnage	# of Trips/ Day ²			
Monday	1801	City of New Berlin	15.70	31.40	20	40	48	\$37.44	\$9.12	\$46.56	1.5	1.88	7.5	2	\$403.52	\$4,842	
	1802	City of New Berlin	13.20	26.40	22	44	52.8	\$41.18	\$10.03	\$51.22	2	2.5	10	3	\$665.86	\$7,990	
	1803	City of New Berlin	11.50	23.00	18	36	43.2	\$33.70	\$8.21	\$41.90	1.25	1.56	6.2	2	\$363.13	\$4,358	
	1804	City of New Berlin	14.40	28.80	17	34	40.8	\$31.82	\$7.75	\$39.58	1.25	1.56	6.2	2	\$343.03	\$4,116	
	1807	Town of Lisbon	24.50	49.00	34	68	81.6	\$63.65	\$15.50	\$79.15	1.5	1.88	7.5	2	\$685.97	\$8,232	
	1811	Town of Delafield	26.60	53.20	32	64	76.8	\$69.90	\$14.59	\$74.50	1	1.25	5	2	\$645.67	\$7,748	
	1812	Village of Dousman	31.80	63.60	40	80	96	\$74.88	\$18.24	\$93.12	1	1.25	5	2	\$807.04	\$9,684	
	1813	City of New Berlin	20.10	40.20	25	50	60	\$46.80	\$11.40	\$58.20	1	1.25	5	2	\$504.40	\$6,053	
	1814	Town of Delafield	23.70	47.40	31	62	74.4	\$58.03	\$14.14	\$72.17	1.25	1.56	6.2	2	\$625.47	\$7,506	
	1816	Town of Lisbon	26.20	52.40	35	70	84	\$65.52	\$15.96	\$81.48	1.5	1.88	7.5	2	\$706.16	\$8,474	
	1853	City of Brookfield	12.30	24.60	18	36	43.2	\$33.70	\$8.21	\$41.90	1.25	1.56	6.2	2	\$363.13	\$4,358	
	1854	City of Brookfield	14.90	29.80	22	44	52.8	\$41.18	\$10.03	\$51.22	1.25	1.56	6.2	2	\$443.91	\$5,327	
	1855	City of Brookfield	13.50	27.00	20	40	48	\$37.44	\$9.12	\$46.56	1.25	1.56	6.2	2	\$403.52	\$4,842	
	1862	City of Waukesha	18.90	37.80	29	58	69.6	\$54.29	\$13.22	\$67.51	2	2.5	10	3	\$877.63	\$10,532	
	1864	Village of Elm Grove	9.80	19.60	15	30	36	\$28.08	\$6.84	\$34.92	1.25	1.56	6.2	2	\$302.64	\$3,632	
	1869	City of Waukesha	17.80	35.60	26	52	62.4	\$48.67	\$11.86	\$60.53	1.5	1.88	7.5	2	\$524.59	\$6,295	
	1870	City of Waukesha	17.40	34.80	25	50	60	\$46.80	\$11.40	\$58.20	1.5	1.88	7.5	2	\$504.40	\$6,053	
	1871	City of Waukesha	16.90	33.80	24	48	57.6	\$44.93	\$10.94	\$55.87	1.5	1.88	7.5	2	\$484.21	\$5,810	
Tuesday	2801	City of New Berlin	9.30	18.60	15	30	36	\$28.08	\$6.84	\$34.92	1.25	1.56	6.2	2	\$302.64	\$3,632	
	2803	City of New Berlin	10.30	20.60	17	34	40.8	\$31.82	\$7.75	\$39.58	1.25	1.56	6.2	2	\$343.03	\$4,116	
	2804	City of New Berlin	11.50	23.00	18	36	43.2	\$33.70	\$8.21	\$41.90	1.5	1.88	7.5	2	\$363.13	\$4,358	
	2805	City of New Berlin	12.30	24.60	19	38	45.6	\$35.57	\$8.66	\$44.23	1.5	1.88	7.5	2	\$383.33	\$4,600	
	2806	City of New Berlin	12.90	25.80	18	36	43.2	\$33.70	\$8.21	\$41.90	1.5	1.88	7.5	2	\$363.13	\$4,358	
	2819	City of Pewaukee	15.10	30.20	20	40	48	\$37.44	\$9.12	\$46.56	1	1.25	5	2	\$403.52	\$4,842	
	2820	City of Delafield	26.80	53.60	35	70	84	\$65.52	\$15.96	\$81.48	1.25	1.56	6.2	2	\$706.16	\$8,474	
	2821	Town of Delafield/Village of Hartland	24.80	49.60	29	58	69.6	\$54.29	\$13.22	\$67.51	1	1.25	5	2	\$585.09	\$7,021	
	2822	City of Oconomowoc	34.10	68.20	39	78	93.6	\$73.01	\$17.78	\$90.79	1.5	1.88	7.5	2	\$786.85	\$9,442	
	2823	City of Oconomowoc	30.50	61.00	36	72	86.4	\$67.39	\$16.42	\$83.81	1.25	1.56	6.2	2	\$726.35	\$8,716	
	2824	City of Oconomowoc	34.10	68.20	40	80	96	\$74.88	\$18.24	\$93.12	1.5	1.88	7.5	2	\$807.04	\$9,684	
	2853	City of Brookfield	10.30	20.60	15	30	36	\$28.08	\$6.84	\$34.92	1.5	1.88	7.5	2	\$302.64	\$3,632	
2854	City of Brookfield	12.40	24.80	19	38	45.6	\$35.57	\$8.66	\$44.23	1.5	1.88	7.5	2	\$383.33	\$4,600		
2855	City of Brookfield	11.80	23.60	18	36	43.2	\$33.70	\$8.21	\$41.90	1.5	1.88	7.5	2	\$363.13	\$4,358		
2860	Town of Waukesha	21.40	42.80	32	64	76.8	\$59.90	\$14.59	\$74.50	1	1.25	5	2	\$645.67	\$7,748		
2861	Town of Waukesha	21.20	42.40	34	68	81.6	\$63.65	\$15.50	\$79.15	1	1.25	5	2	\$685.97	\$8,232		

Appendix A - Table 2 - Transportation Cost Analysis
Alternative A - Milwaukee MRF Using Recycling Trucks

To and From a Milwaukee MRF at 1300 Mt. Vernon Road																
Day	Routes	Municipality	Distance (miles)		Time (minutes)			Cost ¹								
								Labor per trip	Maint/Fuel per trip	Total cost per trip	Trips		# of Trips/ Day ²	Monthly Cost ³	Annual Cost ³	
			one- way	round- trip	one- way	round- trip	20% Inflated truck time	Current Truckloads/ Day	25% Increased Truckloads	Route Tonnage						
Tuesday (cont')	2862	City of Waukesha	17.20	34.40	25	50	60	\$46.80	\$11.40	\$58.20	1	1.25	5	2	\$504.40	\$6,053
	2869	City of Waukesha	16.50	33.00	23	46	55.2	\$43.06	\$10.49	\$53.54	1.25	1.56	6.2	2	\$464.01	\$5,568
	2870	City of Waukesha	16.70	33.40	24	48	57.6	\$44.93	\$10.94	\$55.87	1.25	1.56	6.2	2	\$484.21	\$5,810
	2871	City of Waukesha	16.10	32.20	23	46	55.2	\$43.06	\$10.49	\$53.54	1.25	1.56	6.2	2	\$464.01	\$5,568
	2840	Village of Hartland	25.20	50.40	29	58	69.6	\$54.29	\$13.22	\$67.51	1	1.25	5	2	\$585.09	\$7,021
	2841	Village of Hartland	25.20	50.40	29	58	69.6	\$54.29	\$13.22	\$67.51	1	1.25	5	2	\$585.09	\$7,021
	3817	City of Delafield	27.00	54.00	36	72	86.4	\$67.39	\$16.42	\$83.81	1.25	1.56	6.2	2	\$726.35	\$8,716
	3821	Village of Hartland/Village of Wales	25.60	51.20	30	60	72	\$56.16	\$13.68	\$69.84	1	1.25	5	2	\$605.28	\$7,263
	3822	City of Oconomowoc	33.50	67.00	39	78	93.6	\$73.01	\$17.78	\$90.79	1.5	1.88	7.5	2	\$786.85	\$9,442
	3829	Town of Brookfield	13.40	26.80	18	36	43.2	\$33.70	\$8.21	\$41.90	1.25	1.56	6.2	2	\$363.13	\$4,358
	3830	City of Delafield/Village of Nashotah	28.80	57.60	32	64	76.8	\$59.90	\$14.59	\$74.50	1.25	1.56	6.2	2	\$645.67	\$7,748
	3831	Village of Merton	26.00	52.00	32	64	76.8	\$59.90	\$14.59	\$74.50	1.25	1.56	6.2	2	\$645.67	\$7,748
	3832	Town of Brookfield	13.30	26.60	17	34	40.8	\$31.82	\$7.75	\$39.58	1.25	1.56	6.2	2	\$343.03	\$4,116
	3833	Town of Brookfield/City of Pewaukee	16.60	33.20	24	48	57.6	\$44.93	\$10.94	\$55.87	1.5	1.88	7.5	2	\$484.21	\$5,810
	3835	City of Oconomowoc/Village of Lac La Belle	33.80	67.60	39	78	93.6	\$73.01	\$17.78	\$90.79	1.5	1.88	7.5	2	\$786.85	\$9,442
	3840	Village of Hartland/Village of Wales	26.20	52.40	31	62	74.4	\$58.03	\$14.14	\$72.17	1	1.25	5	2	\$625.47	\$7,506
	3841	Village of Hartland/Village of Wales	27.00	54.00	34	68	81.6	\$63.65	\$15.50	\$79.15	1	1.25	5	2	\$685.97	\$8,232
Wednesday	3853	City of Brookfield	13.00	26.00	23	46	55.2	\$43.06	\$10.49	\$53.54	1.5	1.88	7.5	2	\$464.01	\$5,568
	3854	City of Brookfield	15.20	30.40	22	44	52.8	\$41.18	\$10.03	\$51.22	1.5	1.88	7.5	2	\$443.91	\$5,327
	3855	City of Brookfield	14.40	28.80	21	42	50.4	\$39.31	\$9.58	\$48.89	1.5	1.88	7.5	2	\$423.71	\$5,085
	3862	City of Waukesha	19.60	39.20	25	50	60	\$46.80	\$11.40	\$58.20	1	1.25	5	2	\$504.40	\$6,053
	3864	Village of Elm Grove	9.80	19.60	17	34	40.8	\$31.82	\$7.75	\$39.58	1.25	1.56	6.2	2	\$343.03	\$4,116
	3869	City of Waukesha	15.90	31.80	21	42	50.4	\$39.31	\$9.58	\$48.89	1.25	1.56	6.2	2	\$423.71	\$5,085
	3870	City of Waukesha	15.10	30.20	19	38	45.6	\$35.57	\$8.66	\$44.23	1.25	1.56	6.2	2	\$383.33	\$4,600
	3871	City of Waukesha	14.10	28.20	18	36	43.2	\$33.70	\$8.21	\$41.90	1.25	1.56	6.2	2	\$363.13	\$4,358
	4808	Town of Lisbon	22.20	44.40	33	66	79.2	\$61.78	\$15.05	\$76.82	1.25	1.56	6.2	2	\$665.77	\$7,989
	4816	Town of Lisbon	18.30	36.60	31	62	74.4	\$58.03	\$14.14	\$72.17	1.25	1.56	6.2	2	\$625.47	\$7,506
Thursday	4838	City of Pewaukee/Town of Merton	19.40	38.80	27	54	64.8	\$50.54	\$12.31	\$62.86	1.5	1.88	7.5	2	\$544.79	\$6,537
	4839	Town of Delafield/City of Pewaukee	21.40	42.80	28	56	67.2	\$52.42	\$12.77	\$65.18	1.5	1.88	7.5	2	\$564.89	\$6,779
	4842	City of Pewaukee	20.00	40.00	26	52	62.4	\$48.67	\$11.86	\$60.53	1.25	1.56	6.2	2	\$524.59	\$6,295
	4843	Village of Ocon Lake/Town of Summit	30.30	60.60	37	74	88.8	\$69.26	\$16.87	\$86.14	1.25	1.56	6.2	2	\$746.55	\$8,959
	4844	Town of Summit	29.10	58.20	35	70	84	\$65.52	\$15.96	\$81.48	1.25	1.56	6.2	2	\$706.16	\$8,474
	4845	Town of Summit	30.40	60.80	37	74	88.8	\$69.26	\$16.87	\$86.14	1.25	1.56	6.2	2	\$746.55	\$8,959

Appendix A - Table 2 - Transportation Cost Analysis
Alternative A - Milwaukee MRF Using Recycling Trucks

To and From a Milwaukee MRF at 1300 Mt. Vernon Road																	
Day	Routes	Municipality	Distance				Time				Cost ¹						
			(miles)		(minutes)		Labor per trip	Maint/Fuel per trip	Total cost per trip	Trips			Monthly Cost ³	Annual Cost ³			
			one- way	round- trip	one- way	round- trip				20% Inflated truck time	Current Truckloads/ Day	25% Increased Truckloads			Route Tonnage	# of Trips/ Day ²	
Thursday (cont)	4853	City of Brookfield	15.00	30.00	21	42	50.4	\$39.31	\$9.58	\$48.89	1.5	1.88	7.5	2	\$423.71	\$5,085	
	4854	City of Brookfield	13.10	26.20	19	38	45.6	\$35.57	\$8.66	\$44.23	1.5	1.88	7.5	2	\$383.33	\$4,600	
	4855	City of Brookfield	12.10	24.20	19	38	45.6	\$35.57	\$8.66	\$44.23	1.5	1.88	7.5	2	\$383.33	\$4,600	
	4864	Village of Elm Grove	10.70	21.40	16	32	38.4	\$29.95	\$7.30	\$37.25	1.25	1.56	6.2	2	\$322.83	\$3,874	
	4866	City of Waukesha	21.20	42.40	28	56	67.2	\$52.42	\$12.77	\$65.18	1	1.25	5	2	\$564.89	\$6,779	
	4867	City of Pewaukee	17.10	34.20	22	44	52.8	\$41.18	\$10.03	\$51.22	1.25	1.56	6.2	2	\$443.91	\$5,327	
	4869	City of Waukesha	19.20	38.40	24	48	57.6	\$44.93	\$10.94	\$55.87	1.25	1.56	6.2	2	\$484.21	\$5,810	
	4870	City of Waukesha	18.90	37.80	24	48	57.6	\$44.93	\$10.94	\$55.87	1.25	1.56	6.2	2	\$484.21	\$5,810	
	4871	City of Waukesha	19.00	38.00	25	50	60	\$46.80	\$11.40	\$58.20	1.25	1.56	6.2	2	\$504.40	\$6,053	
	5809	Town of Delafield	26.40	52.80	32	64	76.8	\$59.90	\$14.59	\$74.50	1.25	1.56	6.2	2	\$645.67	\$7,748	
Friday	5836	Town of Merton	30.10	60.20	39	78	93.6	\$73.01	\$17.78	\$90.79	1	1.25	5	2	\$786.85	\$9,442	
	5838	Town of Merton/Town of Oconomowoc	30.10	60.20	39	78	93.6	\$73.01	\$17.78	\$90.79	1	1.25	5	2	\$786.85	\$9,442	
	5846	Town of Oconomowoc/Town of Merton	31.70	63.40	38	76	91.2	\$71.14	\$17.33	\$88.46	1	1.25	5	2	\$766.65	\$9,200	
	5847	City of Pewaukee/Town of Oconomowoc	32.90	65.80	36	72	86.4	\$67.39	\$16.42	\$83.81	1	1.25	5	2	\$726.35	\$8,716	
	5848	Town of Merton/Village of Chenequa	26.50	53.00	33	66	79.2	\$61.78	\$15.05	\$76.82	1	1.25	5	2	\$665.77	\$7,989	
	5850	Village of Pewaukee	19.40	38.80	26	52	62.4	\$48.67	\$11.86	\$60.53	1.5	1.88	7.5	2	\$524.59	\$6,295	
	5852	Town of Oconomowoc/Town of Merton	31.10	62.20	33	66	79.2	\$61.78	\$15.05	\$76.82	1.25	1.56	6.2	2	\$665.77	\$7,989	
	5853	City of Brookfield	9.40	18.80	15	30	36	\$28.08	\$6.84	\$34.92	1.25	1.56	6.2	2	\$302.64	\$3,632	
	5854	City of Brookfield	11.20	22.40	16	32	38.4	\$29.95	\$7.30	\$37.25	1.25	1.56	6.2	2	\$322.83	\$3,874	
	5855	City of Brookfield	8.80	17.60	14	28	33.6	\$26.21	\$6.38	\$32.59	1.25	1.56	6.2	2	\$282.45	\$3,389	
	5859	Town of Oconomowoc	37.10	74.20	44	88	105.6	\$82.37	\$20.06	\$102.43	1	1.25	5	2	\$887.73	\$10,653	
	5860	Town of Waukesha	22.90	45.80	28	56	67.2	\$52.42	\$12.77	\$65.18	1	1.25	5	2	\$564.89	\$6,779	
	5864	Town of Waukesha	18.40	36.80	27	54	64.8	\$50.54	\$12.31	\$62.86	1	1.25	5	2	\$544.79	\$6,537	
	5869	City of Waukesha	21.90	43.80	30	60	72	\$56.16	\$13.68	\$69.84	1.5	1.88	7.5	2	\$605.28	\$7,263	
	5870	City of Waukesha	20.70	41.40	29	58	69.6	\$54.29	\$13.22	\$67.51	1.5	1.88	7.5	2	\$585.09	\$7,021	
	5871	City of Waukesha	18.70	37.40	29	58	69.6	\$54.29	\$13.22	\$67.51	1.5	1.88	7.5	2	\$585.09	\$7,021	
	5874	Village of Pewaukee	18.30	36.60	24	48	57.6	\$44.93	\$10.94	\$55.87	1.5	1.88	7.5	2	\$484.21	\$5,810	
	5886	City of Waukesha	21.70	43.40	33	66	79.2	\$61.78	\$15.05	\$76.82	1	1.25	5	2	\$665.77	\$7,989	
	5861	Village of Lac La Belle	34.70	69.40	40	80	96	\$74.88	\$18.24	\$93.12	1.25	1.56	6.2	2	\$807.04	\$9,684	
	Eagle	Village of Eagle	35.70	71.40	45	90	108	\$84.24	\$20.52	\$104.76	1	1.25	5	2	\$907.92	\$10,895	
Big Bend	Village of Big Bend	22.40	44.80	24	48	57.6	\$44.93	\$10.94	\$55.87	1	1.25	5	2	\$484.21	\$5,810		
			2,001	4,001	2,634	5,268	6,322	\$4,930.88	\$1,201.05	\$6,131.92					\$53,657.80	\$643,893	

Appendix A - Table 2 - Transportation Cost Analysis Alternative A - Milwaukee MRF Using Recycling Trucks

[illegible]

Notes:

1. Costs based on round trips.
2. Number of trips/day is the number of truckloads/day, after the 25% increase, rounded up to the nearest whole number of trips.
3. Cost based on collection every week, for alternate week collection assume additional trucks will be used requiring same number of trips as weekly collection. Annual cost rounded to the nearest dollar.

Appendix B

Alternative B - Transfer Station in Waukesha, Haul to Milwaukee MRF

Transfer Station Equipment and Operation Cost Estimate

Prepared by: Don Pirrung, AECOM
June 18, 2010

- A. Estimated equipment cost (from Table 6) is \$870,000
annual cost based on 3.5% interest,
10-year payback (factor 0.12) is \$104,400

- B. Transfer Station Labor: Use automatic scanner
at scale house, so no scale person. Use only
front-end load operator

Operator Labor: \$46.58/hour x 2,080 hours = \$96,900
One person, full-time

- C. Convert equipment cost to cost per load:
Total: 26,000 tons/year, (80% goes to transfer station,
20% goes to Milwaukee MRF)
Transfer Station Volume: $0.8 \times 26,000 \text{ tons/year} = 20,800 \text{ tons/year}$
27 tons/load
Transfer Station Loads: 770 loads per year

$770 \text{ loads per year} \times \text{week}/5 \text{ days} \times \text{year}/52 \text{ weeks} = 3 \text{ loads/day}$

\$104,400 per year for equipment cost
Cost: \$136/load

- D. Transporting recyclables from Waukesha Transfer
Station to Milwaukee MRF is 18.6 miles one way,
37 miles round trip. Consider haul time including
Loading and unloading is 1.5 to 2.0 hours

1. Transportation Labor: \$46.58/hour x 2,080 hours = \$96,900
One person, full-time.
2. Maintenance/fuel = \$11.20/hour
3 loads/day at 1.5 to 2.0 hours/load
Consider truck running 8 hours/day
Maintenance/fuel = \$23,300 per year
Utilities/loader fuel = \$12,000 per year

- E. Calculate cost per truck load based on 770 loads per year.

1. Equipment cost per load	\$136
2. Truck labor per load	\$126
3. Maintenance/fuel per load	\$30
4. Utilities	\$16
5. Add overhead and profit, add 15%	<u>\$46</u>

Estimated Cost Per Load: \$354

- F. Calculate cost per ton:

$\$354 \text{ per load} \times 1 \text{ load}/27 \text{ tons} = \$13/\text{ton}$

Appendix B, Table 1
Alternative B -Transfer Station in Waukesha, Haul to Milwaukee MRF

	Total	Waukesha County
Portion of total ¹	100%	44%
Capital Costs Waukesha Transfer Station		
Cost to remove old equipment & modify existing MRF =	NA	-\$350,000
New Transfer Facility Equipment =		-\$131,000
Total Transfer Station Capital Costs =	NA	-\$481,000
Annual Costs Waukesha Transfer Station		
Transfer Facility Operating and Maintenance Costs =	\$13/ton	
Estimated Annual recyclables volume ¹ (tons) =	NA	18,304 to 21,120
Operating and Maintenance Costs =	NA	-\$237,952 to -\$274,560
Capital Costs Milwaukee MRF²		
Cost to demolish equipment & modify existing MRF =	-\$250,000	-\$110,000
Single Stream Processing Equipment =	-\$6,802,000	-\$2,992,880
Total Milwaukee MRF Capital Costs =	-\$7,052,000	-\$3,102,880
Annual Costs Milwaukee MRF²		
Operating and Maintenance Costs =	\$46/ton	
Estimated Annual recyclables volume ¹ (tons)	52,000 to 60,000	22,880 to 26,400
Operating and Maintenance Costs =	-\$2,392,000 to -\$2,760,000	-\$1,052,480 to -\$1,214,400
Annual Income Milwaukee MRF²		
Average Anticipated Recycled Material Price ³ =	\$100/ton	
Annual Recyclable Income =	\$5,200,000 to \$6,000,000	\$2,288,000 to \$2,640,000
Annual Hauling Costs		
Recycling trucks hauling to Transfer Station or MRF	NA	-418,000
Totals		
Total Capital Costs =	-\$7,052,000	-\$3,583,880
Total Annual Costs=	NA	-\$1,708,432 to -\$1,906,960
Total Annual Income=	\$5,200,000 to \$6,000,000	\$2,288,000 to \$2,640,000
Present Worth⁴		
See calculation page for Uniform Present Worth Factor (UPWF), UPWF = 9.11		
Present Worth - Capital Costs	NA	-\$3,580,000
Present Worth - Annual Costs	NA	-15,560,000 to -17,370,000
Present Worth - Annual Income	NA	20,840,000 to 24,050,000
Present Worth =	NA	\$1,700,000 to \$3,100,000

Notes

1. Estimated annual recyclables volume and portion attributed to each municipality are discussed in Section 4.2. The estimated annual recyclables volume for the Waukesha Transfer Station are approximately 80% of the total County recyclables volume to account for recycling routes that are anticipated to haul directly to the Milwaukee MRF.

2. Costs for the Milwaukee MRF are based on the Waukesha County share (44%) of the costs presented in Section 4.2.

3. Average anticipated recycled material price based on the low, \$90/ton, and high, \$110/ton. Prices are discussed in Section 4.2.5.

4. Present worth = (((UPWF) x (Annual Income - Annual Costs))-Capital Costs), a positive number indicates profit, negative number indicates cost.

Appendix B - Table 2 - Transportation Cost Analysis
Alternative B - Transfer Station in Waukesha, Haul to Milwaukee MRF

Day	Routes	Municipality	Direct transport to Milwaukee MRF ⁴	To and From Waukesha Transfer Station at 220 South Prairie													
				Distance ¹			Time			Cost ¹							
				(miles)	one- round- trip	one- round- trip	20% Inflated truck time	Labor per trip	Maint/Fuel per trip	Total cost per trip	Trips						
											Current Truckloads/Day	25% Increased Truckloads	Route Tonnage	# of Trips/Day ²	Monthly Cost ³	Annual Cost ³	
Monday	1801	City of New Berlin	No	8.90	17.80	20	40	48	\$37.44	\$9.12	\$46.56	1.5	1.88	7.5	2	\$403.52	\$4,842
	1802	City of New Berlin	No	6.60	13.20	16	32	38.4	\$29.95	\$7.30	\$37.25	2	2.5	10	3	\$484.25	\$5,811
	1803	City of New Berlin	Yes	11.50	23.00	18	36	43.2	\$33.70	\$8.21	\$41.90	1.25	1.56	6.2	2	\$363.13	\$4,358
	1804	City of New Berlin	Yes	14.40	28.80	17	34	40.8	\$31.82	\$7.75	\$39.58	1.25	1.56	6.2	2	\$343.03	\$4,116
	1807	Town of Lisbon	No	13.50	27.00	26	52	62.4	\$48.67	\$11.86	\$60.53	1.5	1.88	7.5	2	\$524.59	\$6,295
	1811	Town of Delafield	No	11.10	22.20	17	34	40.8	\$31.82	\$7.75	\$39.58	1	1.25	5	2	\$343.03	\$4,116
	1812	Village of Dousman	No	14.70	29.40	22	44	52.8	\$41.18	\$10.03	\$51.22	1	1.25	5	2	\$443.91	\$5,327
	1813	City of New Berlin	No	5.90	11.80	12	24	28.8	\$22.46	\$5.47	\$27.94	1	1.25	5	2	\$242.15	\$2,906
	1814	Town of Delafield	No	9.00	18.00	14	28	33.6	\$26.21	\$6.38	\$32.59	1.25	1.56	6.2	2	\$282.45	\$3,389
	1816	Town of Lisbon	No	15.20	30.40	28	56	67.2	\$52.42	\$12.77	\$65.18	1.5	1.88	7.5	2	\$564.89	\$6,779
	1853	City of Brookfield	Yes	12.30	24.60	18	36	43.2	\$33.70	\$8.21	\$41.90	1.25	1.56	6.2	2	\$363.13	\$4,358
	1854	City of Brookfield	Yes	14.90	29.80	22	44	52.8	\$41.18	\$10.03	\$51.22	1.25	1.56	6.2	2	\$443.91	\$5,327
	1855	City of Brookfield	Yes	13.50	27.00	20	40	48	\$37.44	\$9.12	\$46.56	1.25	1.56	6.2	2	\$403.52	\$4,842
	1862	City of Waukesha	No	1.30	2.60	3	6	7.2	\$5.62	\$1.37	\$6.98	2	2.5	10	3	\$90.74	\$1,089
	1864	Village of Elm Grove	Yes	9.80	19.60	15	30	36	\$28.08	\$6.84	\$34.92	1.25	1.56	6.2	2	\$302.64	\$3,632
	1869	City of Waukesha	No	1.20	2.40	4	8	9.6	\$7.49	\$1.82	\$9.31	1.5	1.88	7.5	2	\$80.69	\$968
	1870	City of Waukesha	No	1.70	3.40	5	10	12	\$9.36	\$2.28	\$11.64	1.5	1.88	7.5	2	\$100.88	\$1,211
Tuesday	1871	City of Waukesha	No	3.20	6.40	8	16	19.2	\$14.98	\$3.65	\$18.62	1.5	1.88	7.5	2	\$161.37	\$1,936
	2801	City of New Berlin	Yes	9.30	18.60	15	30	36	\$28.08	\$6.84	\$34.92	1.25	1.56	6.2	2	\$302.64	\$3,632
	2803	City of New Berlin	Yes	10.30	20.60	17	34	40.8	\$31.82	\$7.75	\$39.58	1.25	1.56	6.2	2	\$343.03	\$4,116
	2804	City of New Berlin	Yes	11.50	23.00	18	36	43.2	\$33.70	\$8.21	\$41.90	1.5	1.88	7.5	2	\$363.13	\$4,358
	2805	City of New Berlin	No	6.10	12.20	14	28	33.6	\$26.21	\$6.38	\$32.59	1.5	1.88	7.5	2	\$282.45	\$3,389
	2806	City of New Berlin	Yes	12.90	25.80	18	36	43.2	\$33.70	\$8.21	\$41.90	1.5	1.88	7.5	2	\$363.13	\$4,358
	2819	City of Pewaukee	No	3.90	7.80	10	20	24	\$18.72	\$4.56	\$23.28	1	1.25	5	2	\$201.76	\$2,421
	2820	City of Delafield	No	13.50	27.00	26	52	62.4	\$48.67	\$11.86	\$60.53	1.25	1.56	6.2	2	\$524.59	\$6,295
	2821	Town of Delafield/Village of Hartland	No	13.80	27.60	22	44	52.8	\$41.18	\$10.03	\$51.22	1	1.25	5	2	\$443.91	\$5,327
	2822	City of Oconomowoc	No	23.10	46.20	31	62	74.4	\$58.03	\$14.14	\$72.17	1.5	1.88	7.5	2	\$625.47	\$7,506
	2823	City of Oconomowoc	No	17.20	34.40	27	54	64.8	\$50.54	\$12.31	\$62.86	1.25	1.56	6.2	2	\$544.79	\$6,537
	2824	City of Oconomowoc	No	23.10	46.20	32	64	76.8	\$59.90	\$14.59	\$74.50	1.5	1.88	7.5	2	\$645.67	\$7,748
	2853	City of Brookfield	Yes	10.30	20.60	15	30	36	\$28.08	\$6.84	\$34.92	1.5	1.88	7.5	2	\$302.64	\$3,632
	2854	City of Brookfield	Yes	12.40	24.80	19	38	45.6	\$35.57	\$8.66	\$44.23	1.5	1.88	7.5	2	\$383.33	\$4,600
	2855	City of Brookfield	Yes	11.80	23.60	18	36	43.2	\$33.70	\$8.21	\$41.90	1.5	1.88	7.5	2	\$363.13	\$4,358
	2860	Town of Waukesha	No	3.80	7.60	9	18	21.6	\$16.85	\$4.10	\$20.95	1	1.25	5	2	\$181.57	\$2,179
	2861	Town of Waukesha	No	4.30	8.60	10	20	24	\$18.72	\$4.56	\$23.28	1	1.25	5	2	\$201.76	\$2,421

Appendix B - Table 2 - Transportation Cost Analysis
Alternative B - Transfer Station in Waukesha, Haul to Milwaukee MRF

Day	Routes	Municipality	Direct transport to Milwaukee MRF ⁴	To and From Waukesha Transfer Station at 220 South Prairie				Cost ¹				Monthly Cost ³	Annual Cost ³				
				Distance ¹		Time		Trips									
				(miles)	(miles)	(minutes)	20% Inflated truck time	Labor per trip	Maint/Fuel per trip	Total cost per trip	Current Truckloads/Day			25% Increased Truckloads	Route Tonnage	# of Trips/Day ²	
				one-way	round-trip	one-way	round-trip										
Tuesday (con't)	2862	City of Waukesha	No	0.70	1.40	2	4	4.8	\$3.74	\$0.91	\$4.66	1	1.25	5	2	\$40.39	\$485
	2869	City of Waukesha	No	1.30	2.60	4	8	9.6	\$7.49	\$1.82	\$9.31	1.25	1.56	6.2	2	\$80.69	\$968
	2870	City of Waukesha	No	3.20	6.40	9	18	21.6	\$16.85	\$4.10	\$20.95	1.25	1.56	6.2	2	\$181.57	\$2,179
	2871	City of Waukesha	No	2.10	4.20	7	14	16.8	\$13.10	\$3.19	\$16.30	1.25	1.56	6.2	2	\$141.27	\$1,695
	2840	Village of Hartland	No	14.20	28.40	21	42	50.4	\$39.31	\$9.58	\$48.89	1	1.25	5	2	\$423.71	\$5,085
Wednesday	2841	Village of Hartland	No	14.20	28.40	21	42	50.4	\$39.31	\$9.58	\$48.89	1	1.25	5	2	\$423.71	\$5,085
	3817	City of Delafield	No	14.60	29.20	24	48	57.6	\$44.93	\$10.94	\$55.87	1.25	1.56	6.2	2	\$484.21	\$5,810
	3821	Village of Hartland/Village of Wales	No	14.60	29.20	23	46	55.2	\$43.06	\$10.49	\$53.54	1	1.25	5	2	\$464.01	\$5,568
	3822	City of Oconomowoc	No	22.50	45.00	31	62	74.4	\$58.03	\$14.14	\$72.17	1.5	1.88	7.5	2	\$625.47	\$7,506
	3829	Town of Brookfield	No	5.50	11.00	12	24	28.8	\$22.46	\$5.47	\$27.94	1.25	1.56	6.2	2	\$242.15	\$2,906
	3830	City of Delafield/Village of Nashotah	No	17.80	35.60	24	48	57.6	\$44.93	\$10.94	\$55.87	1.25	1.56	6.2	2	\$484.21	\$5,810
	3831	Village of Merton	No	15.00	30.00	24	48	57.6	\$44.93	\$10.94	\$55.87	1.25	1.56	6.2	2	\$484.21	\$5,810
	3832	Town of Brookfield	No	5.50	11.00	13	26	31.2	\$24.34	\$5.93	\$30.26	1.25	1.56	6.2	2	\$262.25	\$3,147
	3833	Town of Brookfield/City of Pewaukee	No	6.20	12.40	17	34	40.8	\$31.82	\$7.75	\$39.58	1.5	1.88	7.5	2	\$343.03	\$4,116
	3835	City of Oconomowoc/Village of Lac La Belle	No	22.80	45.60	32	64	76.8	\$59.90	\$14.59	\$74.50	1.5	1.88	7.5	2	\$645.67	\$7,748
Thursday	3840	Village of Hartland/Village of Wales	No	12.50	25.00	24	48	57.6	\$44.93	\$10.94	\$55.87	1	1.25	5	2	\$484.21	\$5,810
	3841	Village of Hartland/Village of Wales	No	9.50	19.00	15	30	36	\$28.08	\$6.84	\$34.92	1	1.25	5	2	\$302.64	\$3,632
	3853	City of Brookfield	No	8.50	17.00	18	36	43.2	\$33.70	\$8.21	\$41.90	1.5	1.88	7.5	2	\$363.13	\$4,358
	3854	City of Brookfield	No	7.20	14.40	16	32	38.4	\$29.95	\$7.30	\$37.25	1.5	1.88	7.5	2	\$322.83	\$3,874
	3855	City of Brookfield	Yes	14.40	28.80	21	42	50.4	\$39.31	\$9.58	\$48.89	1.5	1.88	7.5	2	\$423.71	\$5,085
	3862	City of Waukesha	No	1.80	3.60	5	10	12	\$9.36	\$2.28	\$11.64	1	1.25	5	2	\$100.88	\$1,211
	3864	Village of Elm Grove	Yes	9.80	19.60	17	34	40.8	\$31.82	\$7.75	\$39.58	1.25	1.56	6.2	2	\$343.03	\$4,116
	3869	City of Waukesha	No	2.00	4.00	6	12	14.4	\$11.23	\$2.74	\$13.97	1.25	1.56	6.2	2	\$121.07	\$1,453
	3870	City of Waukesha	No	2.70	5.40	8	16	19.2	\$14.98	\$3.65	\$18.62	1.25	1.56	6.2	2	\$161.37	\$1,936
	3871	City of Waukesha	No	3.90	7.80	10	20	24	\$18.72	\$4.56	\$23.28	1.25	1.56	6.2	2	\$201.76	\$2,421

Appendix B - Table 2 - Transportation Cost Analysis
Alternative B - Transfer Station in Waukesha, Haul to Milwaukee MRF

Day	Routes	Municipality	Direct transport to Milwaukee MRF ⁴	To and From Waukesha Transfer Station at 220 South Prairie				Cost ¹				Monthly Cost ³	Annual Cost ³				
				Distance ¹		Time		Trips									
				one-way	round-trip	one-way	round-trip	20% Inflated truck time	Labor per trip \$0.78/min	Maint/Fuel per trip \$0.19/min	Total cost per trip \$0.97/min			Current Truckloads/Day	25% Increased Truckloads	Route Tonnage	# of Trips/Day ²
Thursday (con't)	4854	City of Brookfield	No	8.00	16.00	16	32	38.4	\$29.95	\$7.30	\$37.25	1.5	1.88	7.5	2	\$322.83	\$3,874
	4855	City of Brookfield	No	7.00	14.00	16	32	38.4	\$29.95	\$7.30	\$37.25	1.5	1.88	7.5	2	\$322.83	\$3,874
	4864	Village of Elm Grove	Yes	10.70	21.40	16	32	38.4	\$29.95	\$7.30	\$37.25	1.25	1.56	6.2	2	\$322.83	\$3,874
	4866	City of Waukesha	No	4.40	8.80	9	18	21.6	\$16.85	\$4.10	\$20.95	1	1.25	5	2	\$181.57	\$2,179
	4867	City of Pewaukee	No	5.00	10.00	14	28	33.6	\$26.21	\$6.38	\$32.59	1.25	1.56	6.2	2	\$282.45	\$3,389
	4869	City of Waukesha	No	5.10	10.20	12	24	28.8	\$22.46	\$5.47	\$27.94	1.25	1.56	6.2	2	\$242.15	\$2,906
	4870	City of Waukesha	No	3.70	7.40	10	20	24	\$18.72	\$4.56	\$23.28	1.25	1.56	6.2	2	\$201.76	\$2,421
Friday	4871	City of Waukesha	No	2.80	5.60	7	14	16.8	\$13.10	\$3.19	\$16.30	1.25	1.56	6.2	2	\$141.27	\$1,695
	5809	Town of Delafield	No	11.60	23.20	22	44	52.8	\$41.18	\$10.03	\$51.22	1.25	1.56	6.2	2	\$443.91	\$5,327
	5836	Town of Merton	No	16.60	33.20	26	52	62.4	\$48.67	\$11.86	\$60.53	1	1.25	5	2	\$524.59	\$6,295
	5838	Town of Merton/Town of Oconomowoc	No	19.10	38.20	32	64	76.8	\$59.90	\$14.59	\$74.50	1	1.25	5	2	\$645.67	\$7,748
	5846	Town of Oconomowoc/Town of Merton	No	20.70	41.40	30	60	72	\$56.16	\$13.68	\$69.84	1	1.25	5	2	\$605.28	\$7,263
	5847	City of Pewaukee/Town of Oconomowoc	No	21.90	43.80	28	56	67.2	\$52.42	\$12.77	\$65.18	1	1.25	5	2	\$564.89	\$6,779
	5848	Town of Merton/Village of Chenequa	No	15.50	31.00	26	52	62.4	\$48.67	\$11.86	\$60.53	1	1.25	5	2	\$524.59	\$6,295
	5850	Village of Pewaukee	No	7.30	14.60	19	38	45.6	\$35.57	\$8.66	\$44.23	1.5	1.88	7.5	2	\$383.33	\$4,600
	5852	Town of Oconomowoc/Town of Merton	No	20.10	40.20	26	52	62.4	\$48.67	\$11.86	\$60.53	1.25	1.56	6.2	2	\$524.59	\$6,295
	5853	City of Brookfield	Yes	9.40	18.80	15	30	36	\$28.08	\$6.84	\$34.92	1.25	1.56	6.2	2	\$302.64	\$3,632
	5854	City of Brookfield	No	7.90	15.80	15	30	36	\$28.08	\$6.84	\$34.92	1.25	1.56	6.2	2	\$302.64	\$3,632
	5855	City of Brookfield	Yes	8.80	17.60	14	28	33.6	\$26.21	\$6.38	\$32.59	1.25	1.56	6.2	2	\$282.45	\$3,389
	5859	Town of Oconomowoc	No	26.10	52.20	37	74	88.8	\$69.26	\$16.87	\$86.14	1	1.25	5	2	\$746.55	\$8,959
	5860	Town of Waukesha	No	5.60	11.20	11	22	26.4	\$20.59	\$5.02	\$25.61	1	1.25	5	2	\$221.95	\$2,663
	5864	Town of Waukesha	No	3.90	7.80	10	20	24	\$18.72	\$4.56	\$23.28	1	1.25	5	2	\$201.76	\$2,421
5869	City of Waukesha	No	3.00	6.00	9	18	21.6	\$16.85	\$4.10	\$20.95	1.5	1.88	7.5	2	\$181.57	\$2,179	
5870	City of Waukesha	No	2.20	4.40	7	14	16.8	\$13.10	\$3.19	\$16.30	1.5	1.88	7.5	2	\$141.27	\$1,695	
5871	City of Waukesha	No	1.40	2.80	3	6	7.2	\$5.62	\$1.37	\$6.98	1.5	1.88	7.5	2	\$60.49	\$726	
5874	Village of Pewaukee	No	6.70	13.40	17	34	40.8	\$31.82	\$7.75	\$39.58	1.5	1.88	7.5	2	\$343.03	\$4,116	
5886	City of Waukesha	No	3.70	7.40	9	18	21.6	\$16.85	\$4.10	\$20.95	1	1.25	5	2	\$181.57	\$2,179	
5861	Village of Lac La Belle	No	23.70	47.40	32	64	76.8	\$59.90	\$14.59	\$74.50	1.25	1.56	6.2	2	\$645.67	\$7,748	
	Eagle	Village of Eagle	No	16.00	32.00	25	50	60	\$46.80	\$11.40	\$58.20	1	1.25	5	2	\$504.40	\$6,053
	Big Bend	Village of Big Bend	No	9.20	18.40	15	30	36	\$28.08	\$6.84	\$34.92	1	1.25	5	2	\$302.64	\$3,632
				999	1,999	1,719	3,438	4,126	\$3,217.94	\$783.84	\$4,001.86					\$34,874.45	\$418,495

Appendix B - Table 2 - Transportation Cost Analysis
Alternative B - Transfer Station in Waukesha, Haul to Milwaukee MRF

To and From Waukesha Transfer Station at 220 South Prairie																	
Day	Routes	Municipality	Direct transport to Milwaukee MRF ⁴	Cost ¹													
				Distance ¹ (miles)		Time (minutes)			Trips								
									Labor per trip	Maint/Fuel per trip	Total cost per trip	Current Truckloads/Day	25% Increased Truckloads	Route Tonnage	# of Trips/Day ²	Monthly Cost ³	Annual Cost ³
				one-way	round-trip	one-way	round-trip	20% Inflated truck time									

Notes:

- Costs based on round trips.
- Number of trips/day is the number of truckloads/day, after the 25% increase, rounded up to the nearest whole number of trips.
- Cost based on collection every week, for alternate week collection assume additional trucks will be used requiring same numer of trips as weekly collection. Annual cost rounded to the nearest dollar.
- For routes where the travel time from the route centroid to the Milwaukee MRF is shorter than the travel time from the route centroid to the Waukesha Transfer Station, it is assumed that, as a cost saving measure, the route will haul directly to the Milwaukee MRF.

Appendix C

Alternative C - Haul to Optimal MRF Site

Appendix C, Table 1
Alternative C - Haul to Optimal MRF Site

	Total	Waukesha County
Portion of total ²	100%	44%
<u>Optimal MRF Capital Costs</u>		
Property Cost ¹	-\$1,000,000	-\$440,000
Building Construction and Site Improvements	-\$6,000,000	-\$2,640,000
Single Stream Processing Equipment	-\$6,802,000	-\$2,992,880
Total Capital Costs	-\$13,802,000	-\$6,072,880
<u>Optimal MRF Annual Costs</u>		
Operating and Maintenance Costs = \$46/ton		
Estimated Annual recyclables volume ² (tons)	52,000 to 60,000	22,880 to 26,400
Operating and Maintenance Costs	-\$2,392,000 to -\$2,760,000	-\$1,052,480 to -\$1,214,400
<u>Annual Hauling Costs</u>		
Recycling trucks hauling to Optimal MRF	NA	-468,000
<u>Annual Income</u>		
Average Anticipated Recycled Material Price ³ = \$100/ton		
Annual Recyclable Income	\$5,200,000 to \$6,000,000	\$2,288,000 to \$2,640,000
<u>Salvage Value of Building (new facility)</u>	\$3,000,000	\$1,320,000
<u>Present Worth⁴</u>		
See calculation page for Uniform Present Worth Factor (UPWF), UPWF = 9.11		
Present Worth - Capital Costs	NA	-\$6,070,000
Present Worth - Annual Costs	NA	-13,850,000 to -15,330,000
Present Worth - Annual Income	NA	20,840,000 to 24,050,000
Present Worth - Salvage Value	NA	\$480,000
Present Worth	NA	\$1,400,000 to \$3,130,000
<u>Notes</u> 1. Property cost is based on discussions with a local realtor for a 5 acre vacant lot. 2. Estimated annual recyclables volume and portion attributed to each municipality are discussed in Section 4.2. 3. Average anticipated recycled material price based on the low, \$90/ton, and high, \$110/ton. Prices are discussed in Section 4.2.5. 4. Present worth = $(((UPWF) \times (Annual\ Income - Annual\ Costs)) - Capital\ Costs)$, a positive number indicates profit, a negative number indicates cost.		

Appendix C - Table 2 - Transportation Cost Analysis
Alternative C - Haul to Optimal MRF Site

To and From an Optimal MRF at 15600 West Overland Drive																	
Day	Routes	Municipality	Distance ¹				Time				Cost ¹						
			(miles)		(minutes)		(minutes)		Labor per trip	Maint/Fuel per trip	Total cost per trip	Trips			Monthly Cost ³	Annual Cost ³	
			one-way	round-trip	one-way	round-trip	20% Inflated truck time	Current Truckloads/Day				25% Increased Truckloads	Route Tonnage	# of Trips/Day ²			
Monday	1801	City of New Berlin	2.80	5.60	8	16	19.2	\$14.98	\$3.65	\$18.62	1.5	1.88	7.5	2	\$161.37	\$1,936	
	1802	City of New Berlin	2.20	4.40	6	12	14.4	\$11.23	\$2.74	\$13.97	2	2.5	10	3	\$181.61	\$2,179	
	1803	City of New Berlin	0.80	1.60	3	6	7.2	\$5.62	\$1.37	\$6.98	1.25	1.56	6.2	2	\$60.49	\$726	
	1804	City of New Berlin	3.70	7.40	10	20	24	\$18.72	\$4.56	\$23.28	1.25	1.56	6.2	2	\$201.76	\$2,421	
	1807	Town of Lisbon	16.70	33.40	27	54	64.8	\$50.54	\$12.31	\$62.86	1.5	1.88	7.5	2	\$544.79	\$6,537	
	1811	Town of Delafield	18.80	37.60	25	50	60	\$46.80	\$11.40	\$58.20	1	1.25	5	2	\$504.40	\$6,053	
	1812	Village of Dousman	23.90	47.80	33	66	79.2	\$61.78	\$15.05	\$76.82	1	1.25	5	2	\$665.77	\$7,989	
	1813	City of New Berlin	5.90	11.80	14	28	33.6	\$26.21	\$6.38	\$32.59	1	1.25	5	2	\$282.45	\$3,389	
	1814	Town of Delafield	15.90	31.80	24	48	57.6	\$44.93	\$10.94	\$55.87	1.25	1.56	6.2	2	\$484.21	\$5,810	
	1816	Town of Lisbon	18.40	36.80	28	56	67.2	\$52.42	\$12.77	\$65.18	1.5	1.88	7.5	2	\$564.89	\$6,779	
	1853	City of Brookfield	8.10	16.20	21	42	50.4	\$39.31	\$9.58	\$48.89	1.25	1.56	6.2	2	\$423.71	\$5,085	
	1854	City of Brookfield	8.40	16.80	19	38	45.6	\$35.57	\$8.66	\$44.23	1.25	1.56	6.2	2	\$383.33	\$4,600	
	1855	City of Brookfield	7.00	14.00	18	36	43.2	\$33.70	\$8.21	\$41.90	1.25	1.56	6.2	2	\$363.13	\$4,358	
	1862	City of Waukesha	9.00	18.00	19	38	45.6	\$35.57	\$8.66	\$44.23	2	2.5	10	3	\$574.99	\$6,900	
	1864	Village of Elm Grove	4.80	9.60	13	26	31.2	\$24.34	\$5.93	\$30.26	1.25	1.56	6.2	2	\$262.25	\$3,147	
	1869	City of Waukesha	7.80	15.60	17	34	40.8	\$31.82	\$7.75	\$39.58	1.5	1.88	7.5	2	\$343.03	\$4,116	
	1870	City of Waukesha	6.70	13.40	15	30	36	\$28.08	\$6.84	\$34.92	1.5	1.88	7.5	2	\$302.64	\$3,632	
Tuesday	1871	City of Waukesha	6.00	12.00	13	26	31.2	\$24.34	\$5.93	\$30.26	1.5	1.88	7.5	2	\$262.25	\$3,147	
	2801	City of New Berlin	2.20	4.40	7	14	16.8	\$13.10	\$3.19	\$16.30	1.25	1.56	6.2	2	\$141.27	\$1,695	
	2803	City of New Berlin	2.70	5.40	7	14	16.8	\$13.10	\$3.19	\$16.30	1.25	1.56	6.2	2	\$141.27	\$1,695	
	2804	City of New Berlin	3.30	6.60	8	16	19.2	\$14.98	\$3.65	\$18.62	1.5	1.88	7.5	2	\$161.37	\$1,936	
	2805	City of New Berlin	3.50	7.00	7	14	16.8	\$13.10	\$3.19	\$16.30	1.5	1.88	7.5	2	\$141.27	\$1,695	
	2806	City of New Berlin	4.90	9.80	12	24	28.8	\$22.46	\$5.47	\$27.94	1.5	1.88	7.5	2	\$242.15	\$2,906	
	2819	City of Pewaukee	7.30	14.60	13	26	31.2	\$24.34	\$5.93	\$30.26	1	1.25	5	2	\$262.25	\$3,147	
	2820	City of Delafield	19.00	38.00	28	56	67.2	\$52.42	\$12.77	\$65.18	1.25	1.56	6.2	2	\$564.89	\$6,779	
	2821	Town of Delafield/Village of Hartland	17.00	34.00	22	44	52.8	\$41.18	\$10.03	\$51.22	1	1.25	5	2	\$443.91	\$5,327	
	2822	City of Oconomowoc	26.30	52.60	32	64	76.8	\$59.90	\$14.59	\$74.50	1.5	1.88	7.5	2	\$645.67	\$7,748	
	2823	City of Oconomowoc	22.60	45.20	29	58	69.6	\$54.29	\$13.22	\$67.51	1.25	1.56	6.2	2	\$585.09	\$7,021	
	2824	City of Oconomowoc	26.30	52.60	33	66	79.2	\$61.78	\$15.05	\$76.82	1.5	1.88	7.5	2	\$665.77	\$7,989	
	2853	City of Brookfield	6.50	13.00	18	36	43.2	\$33.70	\$8.21	\$41.90	1.5	1.88	7.5	2	\$363.13	\$4,358	
	2854	City of Brookfield	6.10	12.20	16	32	38.4	\$29.95	\$7.30	\$37.25	1.5	1.88	7.5	2	\$322.83	\$3,874	
	2855	City of Brookfield	5.20	10.40	14	28	33.6	\$26.21	\$6.38	\$32.59	1.5	1.88	7.5	2	\$282.45	\$3,389	
	2860	Town of Waukesha	10.50	21.00	21	42	50.4	\$39.31	\$9.58	\$48.89	1	1.25	5	2	\$423.71	\$5,085	
	2861	Town of Waukesha	12.10	24.20	25	50	60	\$46.80	\$11.40	\$58.20	1	1.25	5	2	\$504.40	\$6,053	

Appendix C - Table 2 - Transportation Cost Analysis
Alternative C - Haul to Optimal MRF Site

To and From an Optimal MRF at 15600 West Overland Drive																		
Day	Routes	Municipality	Distance ¹				Time				Cost ¹							
			(miles)		(minutes)		Labor per trip	Maint/Fuel per trip	Total cost per trip	Trips			Monthly Cost ³	Annual Cost ³				
			one-way	round-trip	one-way	round-trip				20% Inflated truck time	Current Truckloads/Day	25% Increased Truckloads			Route Tonnage	# of Trips/Day ²		
Tuesday (cont')	2862	City of Waukesha	8.40	16.80	19	38	45.6	\$35.57	\$8.66	\$44.23	1	1.25	5	2	\$383.33	\$4,600		
	2869	City of Waukesha	6.70	13.40	15	30	36	\$28.08	\$6.84	\$34.92	1.25	1.56	6.2	2	\$302.64	\$3,632		
	2870	City of Waukesha	5.30	10.60	11	22	26.4	\$20.59	\$5.02	\$25.61	1.25	1.56	6.2	2	\$221.95	\$2,663		
	2871	City of Waukesha	6.90	13.80	14	28	33.6	\$26.21	\$6.38	\$32.59	1.25	1.56	6.2	2	\$282.45	\$3,389		
	2840	Village of Hartland	17.30	34.60	22	44	52.8	\$41.18	\$10.03	\$51.22	1	1.25	5	2	\$443.91	\$5,327		
	2841	Village of Hartland	17.30	34.60	22	44	52.8	\$41.18	\$10.03	\$51.22	1	1.25	5	2	\$443.91	\$5,327		
	3817	City of Delafield	19.20	38.40	29	58	69.6	\$54.29	\$13.22	\$67.51	1.25	1.56	6.2	2	\$585.09	\$7,021		
	3821	Village of Hartland/Village of Wales	17.80	35.60	23	46	55.2	\$43.06	\$10.49	\$53.54	1	1.25	5	2	\$464.01	\$5,568		
	3822	City of Oconomowoc	25.70	51.40	32	64	76.8	\$59.90	\$14.59	\$74.50	1.5	1.88	7.5	2	\$645.67	\$7,748		
	3829	Town of Brookfield	5.60	11.20	11	22	26.4	\$20.59	\$5.02	\$25.61	1.25	1.56	6.2	2	\$221.95	\$2,663		
	3830	City of Delafield/Village of Nashotah	21.00	42.00	25	50	60	\$46.80	\$11.40	\$58.20	1.25	1.56	6.2	2	\$504.40	\$6,053		
	3831	Village of Merton	18.20	36.40	25	50	60	\$46.80	\$11.40	\$58.20	1.25	1.56	6.2	2	\$504.40	\$6,053		
	3832	Town of Brookfield	4.80	9.60	10	20	24	\$18.72	\$4.56	\$23.28	1.25	1.56	6.2	2	\$201.76	\$2,421		
	3833	Town of Brookfield/City of Pewaukee	8.70	17.40	17	34	40.8	\$31.82	\$7.75	\$39.58	1.5	1.88	7.5	2	\$343.03	\$4,116		
	3835	City of Oconomowoc/Village of Lac La Belle	25.90	51.80	32	64	76.8	\$59.90	\$14.59	\$74.50	1.5	1.88	7.5	2	\$645.67	\$7,748		
Wednesday	3840	Village of Hartland/Village of Wales	18.30	36.60	24	48	57.6	\$44.93	\$10.94	\$55.87	1	1.25	5	2	\$484.21	\$5,810		
	3841	Village of Hartland/Village of Wales	19.20	38.40	27	54	64.8	\$50.54	\$12.31	\$62.86	1	1.25	5	2	\$544.79	\$6,537		
	3853	City of Brookfield	6.40	12.80	15	30	36	\$28.08	\$6.84	\$34.92	1.5	1.88	7.5	2	\$302.64	\$3,632		
	3854	City of Brookfield	7.30	14.60	15	30	36	\$28.08	\$6.84	\$34.92	1.5	1.88	7.5	2	\$302.64	\$3,632		
	3855	City of Brookfield	7.60	15.20	17	34	40.8	\$31.82	\$7.75	\$39.58	1.5	1.88	7.5	2	\$343.03	\$4,116		
	3862	City of Waukesha	11.70	23.40	18	36	43.2	\$33.70	\$8.21	\$41.90	1	1.25	5	2	\$363.13	\$4,358		
	3864	Village of Elm Grove	3.60	7.20	11	22	26.4	\$20.59	\$5.02	\$25.61	1.25	1.56	6.2	2	\$221.95	\$2,663		
	3869	City of Waukesha	8.00	16.00	14	28	33.6	\$26.21	\$6.38	\$32.59	1.25	1.56	6.2	2	\$282.45	\$3,389		
	3870	City of Waukesha	7.30	14.60	12	24	28.8	\$22.46	\$5.47	\$27.94	1.25	1.56	6.2	2	\$242.15	\$2,906		
	3871	City of Waukesha	6.20	12.40	11	22	26.4	\$20.59	\$5.02	\$25.61	1.25	1.56	6.2	2	\$221.95	\$2,663		
Thursday	4808	Town of Lisbon	16.50	33.00	31	62	74.4	\$58.03	\$14.14	\$72.17	1.25	1.56	6.2	2	\$625.47	\$7,506		
	4816	Town of Lisbon	15.30	30.60	29	58	69.6	\$54.29	\$13.22	\$67.51	1.25	1.56	6.2	2	\$585.09	\$7,021		
	4838	City of Pewaukee/Town of Merton	11.50	23.00	20	40	48	\$37.44	\$9.12	\$46.56	1.5	1.88	7.5	2	\$403.52	\$4,842		
	4839	Town of Delafield/City of Pewaukee	13.50	27.00	21	42	50.4	\$39.31	\$9.58	\$48.89	1.5	1.88	7.5	2	\$423.71	\$5,085		
	4842	City of Pewaukee	12.20	24.40	19	38	45.6	\$35.57	\$8.66	\$44.23	1.25	1.56	6.2	2	\$383.33	\$4,600		
	4843	Village of Ocon Lake/Town of Summit	22.50	45.00	30	60	72	\$56.16	\$13.68	\$69.84	1.25	1.56	6.2	2	\$605.28	\$7,263		
	4844	Town of Summit	21.20	42.40	28	56	67.2	\$52.42	\$12.77	\$65.18	1.25	1.56	6.2	2	\$564.89	\$6,779		
	4845	Town of Summit	22.60	45.20	30	60	72	\$56.16	\$13.68	\$69.84	1.25	1.56	6.2	2	\$605.28	\$7,263		

Appendix C - Table 2 - Transportation Cost Analysis
Alternative C - Haul to Optimal MRF Site

To and From an Optimal MRF at 15600 West Overland Drive																	
Day	Routes	Municipality	Distance ¹				Time				Cost ¹						
			(miles)		(minutes)		Labor		Maint/Fuel		Total cost		Trips		Monthly Cost ³	Annual Cost ³	
			one-way	round-trip	one-way	round-trip	per trip	per trip	per trip	per trip	Current Truckloads/Day	25% Increased Truckloads	Route Tonnage	# of Trips/Day ²			
Thursday (con't)	4853	City of Brookfield	6.20	12.40	14	28	33.6		\$26.21	\$6.38	\$32.59	1.5	1.88	7.5	2	\$282.45	\$3,389
	4854	City of Brookfield	5.00	10.00	11	22	26.4		\$20.59	\$5.02	\$25.61	1.5	1.88	7.5	2	\$221.95	\$2,663
	4855	City of Brookfield	3.30	6.60	8	16	19.2		\$14.98	\$3.65	\$18.62	1.5	1.88	7.5	2	\$161.37	\$1,936
	4864	Village of Elm Grove	4.30	8.60	11	22	26.4		\$20.59	\$5.02	\$25.61	1.25	1.56	6.2	2	\$221.95	\$2,663
	4866	City of Waukesha	13.30	26.60	21	42	50.4		\$39.31	\$9.58	\$48.89	1	1.25	5	2	\$423.71	\$5,085
	4867	City of Pewaukee	9.30	18.60	15	30	36		\$28.08	\$6.84	\$34.92	1.25	1.56	6.2	2	\$302.64	\$3,632
	4869	City of Waukesha	11.30	22.60	17	34	40.8		\$31.82	\$7.75	\$39.58	1.25	1.56	6.2	2	\$343.03	\$4,116
	4870	City of Waukesha	11.00	22.00	17	34	40.8		\$31.82	\$7.75	\$39.58	1.25	1.56	6.2	2	\$343.03	\$4,116
	4871	City of Waukesha	11.20	22.40	18	36	43.2		\$33.70	\$8.21	\$41.90	1.25	1.56	6.2	2	\$363.13	\$4,358
	5809	Town of Delafield	16.80	33.60	26	52	62.4		\$48.67	\$11.86	\$60.53	1.25	1.56	6.2	2	\$524.59	\$6,295
Friday	5836	Town of Merton	19.80	39.60	27	54	64.8		\$50.54	\$12.31	\$62.86	1	1.25	5	2	\$544.79	\$6,537
	5838	Town of Merton/Town of Oconomowoc	22.20	44.40	32	64	76.8		\$59.90	\$14.59	\$74.50	1	1.25	5	2	\$645.67	\$7,748
	5846	Town of Oconomowoc/Town of Merton	23.80	47.60	31	62	74.4		\$58.03	\$14.14	\$72.17	1	1.25	5	2	\$625.47	\$7,506
	5847	City of Pewaukee/Town of Oconomowoc	25.10	50.20	29	58	69.6		\$54.29	\$13.22	\$67.51	1	1.25	5	2	\$585.09	\$7,021
	5848	Town of Merton/Village of Chenequa	18.60	37.20	26	52	62.4		\$48.67	\$11.86	\$60.53	1	1.25	5	2	\$524.59	\$6,295
	5850	Village of Pewaukee	11.60	23.20	19	38	45.6		\$35.57	\$8.66	\$44.23	1.5	1.88	7.5	2	\$383.33	\$4,600
	5852	Town of Oconomowoc/Town of Merton	23.20	46.40	26	52	62.4		\$48.67	\$11.86	\$60.53	1.25	1.56	6.2	2	\$524.59	\$6,295
	5853	City of Brookfield	3.20	6.40	8	16	19.2		\$14.98	\$3.65	\$18.62	1.25	1.56	6.2	2	\$161.37	\$1,936
	5854	City of Brookfield	3.20	6.40	8	16	19.2		\$14.98	\$3.65	\$18.62	1.25	1.56	6.2	2	\$161.37	\$1,936
	5855	City of Brookfield	2.90	5.80	7	14	16.8		\$13.10	\$3.19	\$16.30	1.25	1.56	6.2	2	\$141.27	\$1,695
Big Bend	5859	Town of Oconomowoc	29.30	58.60	37	74	88.8		\$69.26	\$16.87	\$86.14	1	1.25	5	2	\$746.55	\$8,959
	5860	Town of Waukesha	8.20	16.40	21	42	50.4		\$39.31	\$9.58	\$48.89	1	1.25	5	2	\$423.71	\$5,085
	5864	Town of Waukesha	7.50	15.00	16	32	38.4		\$29.95	\$7.30	\$37.25	1	1.25	5	2	\$322.83	\$3,874
	5869	City of Waukesha	14.10	28.20	23	46	55.2		\$43.06	\$10.49	\$53.54	1.5	1.88	7.5	2	\$464.01	\$5,568
	5870	City of Waukesha	12.80	25.60	22	44	52.8		\$41.18	\$10.03	\$51.22	1.5	1.88	7.5	2	\$443.91	\$5,327
	5871	City of Waukesha	8.70	17.40	19	38	45.6		\$35.57	\$8.66	\$44.23	1.5	1.88	7.5	2	\$383.33	\$4,600
	5874	Village of Pewaukee	10.40	20.80	17	34	40.8		\$31.82	\$7.75	\$39.58	1.5	1.88	7.5	2	\$343.03	\$4,116
	5886	City of Waukesha	10.80	21.60	22	44	52.8		\$41.18	\$10.03	\$51.22	1	1.25	5	2	\$443.91	\$5,327
	5861	Village of Lac La Belle	26.90	53.80	33	66	79.2		\$61.78	\$15.05	\$76.82	1.25	1.56	6.2	2	\$665.77	\$7,989
	Eagle	Village of Eagle	23.20	46.40	37	74	88.8		\$69.26	\$16.87	\$86.14	1	1.25	5	2	\$746.55	\$8,959
Big Bend	Village of Big Bend	12.00	24.00	18	36	43.2		\$33.70	\$8.21	\$41.90	1	1.25	5	2	\$363.13	\$4,358	
			1,191	2,383	1,920	3,840	4,608		\$3,594.22	\$875.52	\$4,469.78					\$38,990.29	\$467,879

Appendix C - Table 2 - Transporation Cost Analysis
Alternative C - Haul to Optimal MRF Site

To and From an Optimal MRF at 15600 West Overland Drive													
Day	Routes	Municipality	Cost ¹										
			Distance ¹		Time			Trips					
			(miles)	round-trip	(minutes)	20% Inflated truck time	Labor per trip	Maint/Fuel per trip	Total cost per trip	Current Truckloads/Day	25% Increased Truckloads	Route Tonnage	# of Trips/Day ²

Appendix D

Alternative D - Wauwatosa Hauls to Milwaukee MRF

Appendix D, Table 1
Alternative D - Wauwatosa Hauls to Milwaukee MRF

	Total	City of Wauwatosa
Portion of total ¹	100%	12%
<u>Milwaukee MRF Capital Costs</u>		
Cost to demolish equipment and modify existing MRF	-\$250,000	-\$30,000
Single Stream Processing Equipment	-\$6,802,000	-\$816,240
Total Capital Costs	-\$7,052,000	-\$846,240
<u>Milwaukee MRF Annual Costs</u>		
Operating and Maintenance Costs = \$46/ton		
Estimated Annual recyclables volume ¹ (tons)	52,000 to 60,000	6,240 to 7,200
Operating and Maintenance Costs	-\$2,392,000 to -\$2,760,000	-\$287,040 to -\$331,200
<u>Annual Hauling Costs</u>		
Recycling trucks hauling to Milwaukee MRF	NA	-12,000
<u>Annual Income</u>		
Average Anticipated Recycled Material Price ² = \$100/ton		
Annual Recyclable Income	\$5,200,000 to \$6,000,000	\$624,000 to \$720,000
<u>Present Worth³</u>		
See calculation page for Uniform Present Worth Factor (UPWF), UPWF = 9.11		
Present Worth - Capital Costs	NA	-\$850,000
Present Worth - Annual Costs	NA	-2,720,000 to -3,020,000
Present Worth - Annual Income	NA	5,680,000 to 6,560,000
Present Worth	NA	\$2,110,000 to \$2,690,000
<u>Notes</u>		
1. Estimated annual recyclables volume and portion attributed to each municipality are discussed in Section 4.2.		
2. Average anticipated recycled material price based on the low, \$90/ton, and high, \$110/ton. Prices are discussed in Section 4.2.5.		
3. Present worth = (((UPWF) x (Annual Income - Annual Costs))-Capital Costs), a positive number indicates profit, a negative number indicates cost.		

Appendix E

Alternative E - Wauwatosa Hauls to Optimal MRF Site

Appendix E, Table 1
Alternative E - Wauwatosa Hauls to Optimal MRF Site

	Total	City of Wauwatosa
Portion of total ²	100%	12%
<u>Optimal MRF Capital Costs</u>		
Property Cost ¹	-\$1,000,000	-\$120,000
Building Construction and Site Improvements	-\$6,000,000	-\$720,000
Single Stream Processing Equipment	-\$6,802,000	-\$816,240
Total Capital Costs	-\$13,802,000	-\$1,656,240
<u>Optimal MRF Annual Costs</u>		
Operating and Maintenance Costs = \$46/ton		
Estimated Annual recyclables volume ² (tons)	52,000 to 60,000	6,240 to 7,200
Operating and Maintenance Costs	-\$2,392,000 to -\$2,760,000	-\$287,040 to -\$331,200
<u>Annual Hauling Costs</u>		
Recycling trucks hauling to Optimal MRF	NA	-11,000
<u>Annual Income</u>		
Average Anticipated Recycled Material Price ³ = \$100/ton		
Annual Recyclable Income	\$5,200,000 to \$6,000,000	\$624,000 to \$720,000
<u>Salvage Value of Building (new facility)</u>	\$3,000,000	\$360,000
<u>Present Worth⁴</u>		
See calculation page for Uniform Present Worth Factor (UPWF), UPWF = 9.11		
Present Worth - Capital Costs	NA	-\$1,660,000
Present Worth - Annual Costs	NA	-2,720,000 to -3,120,000
Present Worth - Annual Income	NA	5,680,000 to 6,560,000
Present Worth - Salvage Value	NA	\$130,000
Present Worth	NA	\$1,430,000 to \$1,910,000

Notes

- Property cost is based on discussions with a local realtor for a 5 acre vacant lot.
- Estimated annual recyclables volume and portion attributed to each municipality are discussed in Section 4.2.
- Average anticipated recycled material price based on the low, \$90/ton, and high, \$110/ton. Prices are discussed in Section 4.2.5.
- Present worth = $((UPWF) \times (Annual\ Income - Annual\ Costs)) - Capital\ Costs$, a positive number indicates profit, a negative number indicates cost. Based on 15 year life.

Appendix F

List of Municipalities Included in Waukesha County MRF

2008 Materials Recovery Facility Self Certification

Waukesha County Attachment 1

Section 2.B. List of Municipalities included in Waukesha County Responsible Unit

67002 TOWN OF BROOKFIELD
67004 TOWN OF DELAFIELD
67010 TOWN OF LISBON
67014 TOWN OF MERTON
67022 TOWN OF OCONOMOWOC
67028 TOWN OF SUMMIT
67032 TOWN OF WAUKESHA
67106 VILLAGE OF BIG BEND
67111 VILLAGE OF CHENEQUA
67116 VILLAGE OF DOUSMAN
67121 VILLAGE OF EAGLE
67122 VILLAGE OF ELM GROVE
67136 VILLAGE OF HARTLAND

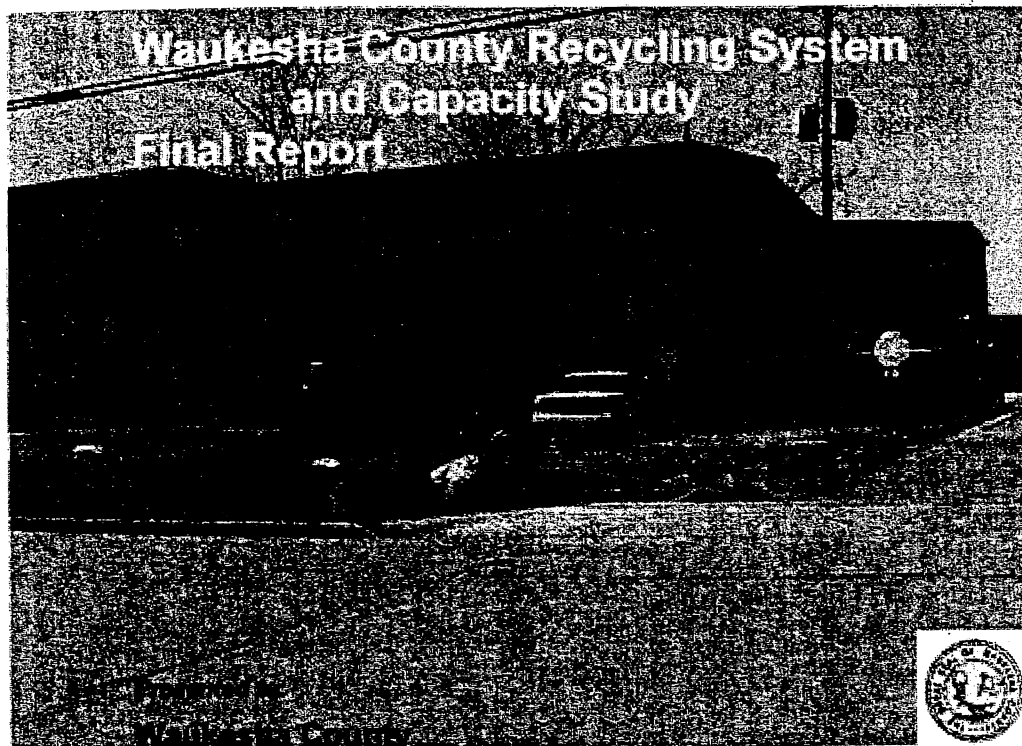
67146 VILLAGE OF LAC LA BELLE
67152 VILLAGE OF MERTON
67158 VILLAGE OF NASHOTAH
67166 VILLAGE OF OCONOMOWOC LAKE
67171 VILLAGE OF PEWAUKEE
67191 VILLAGE OF WALES
67206 CITY OF BROOKFIELD
67216 CITY OF DELAFIELD
67261 CITY OF NEW BERLIN
67265 CITY OF OCONOMOWOC
67026 CITY OF PEWAUKEE
67291 CITY OF WAUKESHA

Appendix G

References and Related Information on Cost Estimating

Waukesha Study

Waukesha Study = Waukesha County Recycling System and Capacity Study Final Report – September 2007



Prepared by:

RRT Design & Construction



GERSHMAN, BRICKNER & BRATTON, INC.

September, 2007

.....
Innovation

.....
Performance

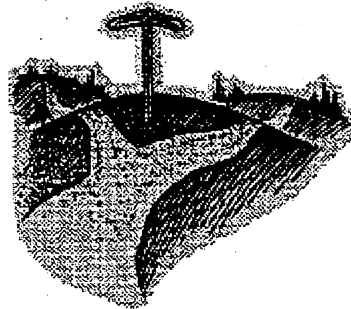
.....
Leadership

Waukesha Presentation

Waukesha County Recycling

Looking Ahead

Perry Lindquist, Land Resources Manager
Waukesha County Dept. of Parks & Land Use



July 27, 2009
Milwaukee Recycling Task Force

Recycling Facility Study City of Milwaukee, Wisconsin Draft No. 2



Site:
Materials Recovery Facility
1313 West Mount Vernon Avenue
Milwaukee, WI 53233

Prepared for:
City of Milwaukee
Zeidler Municipal Building
841 North Broadway, Room 620
Milwaukee, WI 53202

Prepared by:
Earth Tech AECOM
4135 Technology Parkway
Sheboygan, WI 53083

October 2008

Earth Tech AECOM Project No. 108140

Recycling Facility Alternatives Study

City of Milwaukee, Wisconsin



Site:

Materials Recovery Facility
1313 West Mount Vernon Avenue
Milwaukee, WI 53233

Prepared for:

City of Milwaukee
Zeidler Municipal Building
841 North Broadway, Room 620
Milwaukee, WI 53202

Prepared by:

AECOM
4135 Technology Parkway
Sheboygan, WI 53083

November 2009

AECOM Project No. 114079

Table 1-9: Summary of Projected Recyclables for Processing, 2010-2025

Municipal Group	Tonnages Projected for 2010 (tpy)	Tonnages Projected for 2015 (tpy)	Tonnages Projected for 2020 (tpy)	Tonnages Projected for 2025 (tpy)
Dual-Stream Project Requirements:				
Waukesha Co. Participating Municipalities(1)	24,452	25,080	25,724	26,575
Single-Stream Project Requirements:				
Waukesha Co. Participating Municipalities (2)	30,565	31,350	32,155	33,219
Waukesha Co. Non-Participating Municipalities (2)	12,197	12,642	13,089	13,638
City of Milwaukee (3)	28,354	28,723	29,056	29,015
City of Wauwatosa (3)	4,944	4,971	4,992	4,945
Total - All Entities as Regional Single-Stream MRF	76,060	77,686	79,292	80,817
Total w/o Non-Participating Municipalities	63,863	65,044	66,203	67,179



(1) From Table 1-5

(2) From Table 1-6

(3) From Table 1-8

FOOTNOTE #2

SS Pros (Collection) vs. Cons (MRF Impacts)

Single Stream Collection Cost Savings	Single Stream MRF Impacts
• Automation decreases personnel costs (workers comp claims, etc.)	• Increases MRF labor and capital costs
• Large cart allows Every Other Week collection of recyclables	• Increases residue level at MRF (non-recyclables)
• Flexibility: Can use compaction vehicles to reduce capital & trips to the MRF, more households per route – faster collection	• Potential for decreased quality of processed recyclables (glass/paper)
• Higher rates of recycling & reduced landfill disposal costs – easier for the general public to implement (no sorting)	• Higher recyclable volumes to process • Increased net cost per ton processing

All of these factors were built into the economic analysis

Collection Trends/Pressures

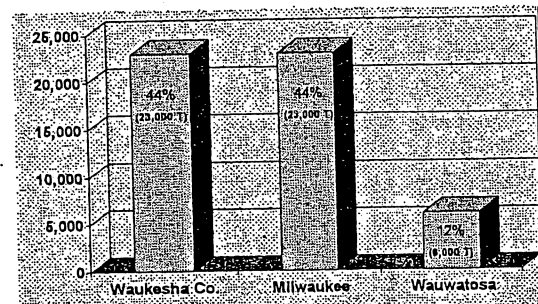
- Private haulers are pushing for Single Stream collection to save money
 - Trend is playing out nationwide
 - >100 SS MRFs (25% in 2008)
 - Locally, only 1 of 3 private haulers (Veolia) still offers dual stream collection
 - Waste Mgt. and Johns already switched to SS
 - 3 participating communities without hauling contracts already switched to SS (problem)
- More communities want to switch to SS

Scenarios for Future Projections:

- Tonnage
 - Participating county municipalities (25)
 - Adding non-participating communities (12)
 - Adding Milwaukee & Wauwatosa
- Single vs. Dual Stream



Annual Tons Recycled (52,000 Tons)*



*Rounded from 2008 data (no other communities included with City of Milwaukee data)


Key Study Findings & Recommendations

1. Switching to Single Stream is strongly recommended
 - Pros far outweigh the cons
 - Could save partic. communities >\$700,000/year in collection & disposal costs
 - 10% or \$12.36/HH/Year savings (minus cart \$)
 - Needs all new MRF equipment/more space
2. Recycling tons increase considerably with a Single Stream system – assumed + 25%
 - In-county data shows 45% increase/capita

Key Study Findings & Recommendations (continued)


3. Doubling tonnage greatly improves the economics of a Single Stream MRF
 - 2 shifts = much faster return on investment
 - New site needed to double tonnage
4. National MRF data shows:
 - SS paper/fiber is equally marketable
 - Increased residue from SS depends on public education (projected increase from 3% to 10%)

Mil. would see about 15% increase because

The body of evidence indicates that single stream recycling is here to stay and should be considered the state of the art when properly designed and operated. This conclusion is reached because of its obvious advantages to the user, the increase in collected tons, and that collection cost savings can be significant. 

Section 2.h - Basis for Future MRF Sizing

For purposes of modeling projections required in Section 3 of the Project Report the following assumptions will be used:

- 
- If municipalities switch to a single stream system, and institute state of the art collection systems along with appropriate public education, the amount of materials collected can increase by 20% to 30%. For purposes of modeling 25% will be used for Waukesha County participating municipalities and for the City of Wauwatosa. For the City of Milwaukee, 10% will be used as the city is already using a large cart for collection of dual stream recyclables (split cart) and therefore tonnages would not be expected to grow by 25%.
 - In recent years the Waukesha MRF has been generating between 3 and 3.5% residue. The evidence suggests that a state of the art well managed single stream collection and public education program can result in total residue levels of well under 10%. For purposes of modeling, 10% will be used.

FOOTNOTE #4

Such an expansion would cost approximately \$3.0 million for the building and site work in both cases, not including cost of additional property. Adding higher capacity Dual Stream processing capability along with an OCC screen would cost approximately \$3.5 million, bringing the total cost to an estimated \$6.5 million. Adding Single Stream capability and reconfiguring the current process lines would cost approximately \$4.0 million, bringing the total to an estimated \$7.0 million. These options would serve the needs of the Participating Municipalities as well as, potentially, the Non-Participating Municipalities.

Due to space and site limitations, neither of these options could serve as a full regional MRF with the projected tonnages of all Participating and Non-Participating Municipalities, in addition to those from Wauwatosa and Milwaukee.

The following tables 3.a.3-1 and 3.a.3-2 present the capital costs and a cost benefit matrix for the expansion of the existing facility:

Table 3.a.3-1: Expansion of Existing Facility Estimated Capital Costs (2007 Dollars)

	Equipment and Systems	Building Costs	Total Costs
Dual Stream	\$3,500,000	\$3,000,000	\$6,500,000
Single Stream	\$4,000,000	\$3,000,000	\$7,000,000



Table 3.a.3-2 : Expanded MRF Cost Benefit Matrix-Median Revenues

Operating Scenario	Year	Annual Capital Cost (1)	Annual Operating Costs (2)	Net Materials Sales Revenue Projection (3)	Est. Yearly Income (Deficit)	Per Ton Income (Deficit) (4)
		Ref. "A"	Ref. "B"	Ref. "C"	Total C-(A+B)	
Dual Stream Participating Only	2010	\$626,225	\$1,050,351	\$1,806,783	\$130,207	\$5.32
Single Stream Participating Only	2010	\$674,396	\$1,345,614	\$2,139,611	\$119,601	\$3.91

(1) Based on a Table 3.a.3-1 with a 15 year financing @ 5% interest rate

(2) Based on Table 3-5

(3) Based on Table 3-8 Materials Net Revenue Projection

(4) Based on Est. Yearly Income divided by the MRF tonnage estimates presented in Table 3-3 and 3-4

US Inflation Calculator

FOOTNOTE #5

Easily find how the buying power of the US dollar has changed from 1913-2009; get inflation rates, charts and inflation news.

[RSS Feed](#) [Comments](#)

- [Home](#)
- [About](#)
- [Inflation News](#)
- [Inflation FAQ's](#)
- [Inflation and Prices](#)
 - [Consumer Price Index Data from 1913 to 2009](#)
 - [Consumer Price Index Release Schedule](#)
 - [Current Inflation Rates: 2000-2009](#)
 - [Historical Inflation Rates: 1914-2009](#)
 - [Annual Averages for Rate of Inflation](#)
- [Terms & Privacy Policy](#)

Search this website...

GO

The US Inflation Calculator measures the buying power of the dollar over time. To begin, just enter any two dates between 1913 and 2009, an amount, and click 'Calculate'.

Inflation Calculator

If in (enter year)

I purchased an item for \$

then in (enter year)

that same item would cost: **\$3,640,967.58**

Rate of inflation change: **4.0%**

How calculator works. Always uses latest available CPI data!

Consumer prices up 0.7% in June, inflation falls 1.4% in year

July 15, 2009 · Filed Under [Inflation](#), [Inflation Rates](#) · [Comment](#)

U.S. consumer prices jumped in June as higher energy costs — gasoline prices in particular — drove up the

3.b.3 New Facility Dual and Single Stream Capital Costs

For purposes of modeling and projections, Table 3-9 summarizes the estimated capital costs for the recommended dual and single stream facility.

Table 3-9: Estimated Capital Costs (2007 Dollars)

	Equipment and Systems	Building Costs	Site Improvement Costs	Total Costs
Dual Stream	\$3,500,000	\$3,500,000	\$750,000	\$7,750,000
Single Stream	\$4,000,000	\$3,500,000	\$750,000	\$8,250,000

Note: These costs include engineering on a green field site not requiring extensive site work or foundation piling, excluding land purchase.

3.b.4 New Facility Dual and Single Stream Cost Benefit Analysis

Tables 3-10 and 3-11 on the following page summarizes the economics of developing either a dual or single stream MRF in Waukesha County for the six different operating scenarios in years 2010, 2015, 2020 and 2025. Cases are presented for low, high, and median material revenues to illustrate the effect of material prices on the economics.

These numbers do not include any revenue share or service fee payments to or from a potential third party operator. They represent the projected costs and revenues associated with building, paying for and operating a dual or single stream MRF in Waukesha County at various tonnage levels over a 15-year period ending in 2025. Clearly, the assumption that all costs will escalate at an annual 3% rate combined with the further assumption that secondary materials revenues will, over time, have a non escalating average strongly affects the results of this analysis. It causes the MRF in lower tonnage operating scenarios to be in a net deficit operating mode during the later years of its life. Of course, higher tonnages, as expected, raise the overall return of any MRF. No profits for a third party operator are included in costs and payments to or from a potential operator and/or sharing of revenue is not calculated. The analysis above, however, provides the County a framework to evaluate its options and select the contract structure most in its advantage.

What is most important under any scenario of MRF development is for the County to determine what tonnages would be made available by local municipalities. The Project Team's recommendations are included in Section 5 of this Report.

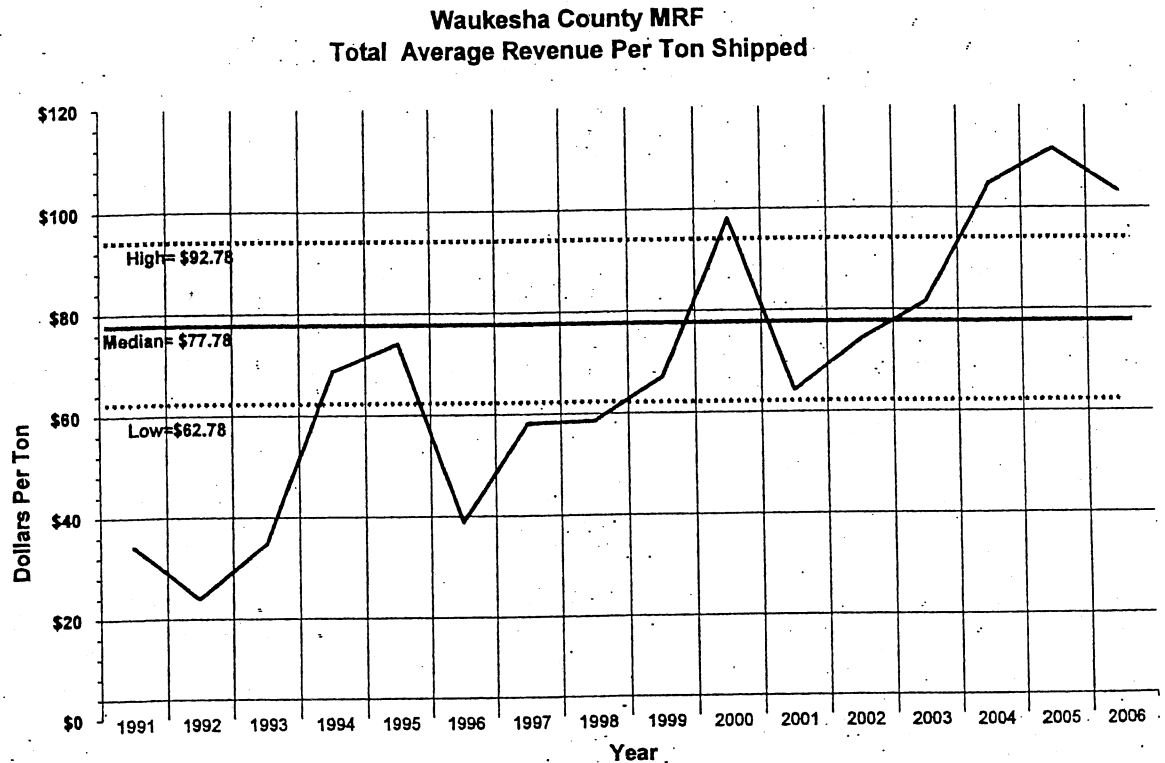
Table 3-5 : Projected MRF Operating Costs - Dual Stream vs. Single Stream

DUAL STREAM MRF				SINGLE STREAM MRF			
Operating Scenario	Year	Annual O&M Cost	Per Ton Operating Cost	Operating Scenario	Year	Annual O&M Cost	Per Ton Operating Cost
Participating ↓	2010	\$ 1,050,351	\$ 42.96	Participating ↓	2010	\$ 1,345,614	\$ 44.02
	2015	\$ 1,206,698	\$ 48.11		2015	\$ 1,539,199	\$ 49.10
	2020	\$ 1,396,262	\$ 54.28		2020	\$ 1,782,981	\$ 55.45
	2025	\$ 1,617,853	\$ 60.88		2025	\$ 2,068,875	\$ 62.28
Participating & Non-Participating ↓	2010	\$ 1,272,078	\$ 34.71	Participating & Non-Participating ↓	2010	\$ 1,620,057	\$ 37.89
	2015	\$ 1,462,762	\$ 38.78		2015	\$ 1,863,500	\$ 42.36
	2020	\$ 1,695,903	\$ 43.69		2020	\$ 2,162,426	\$ 47.79
	2025	\$ 1,969,541	\$ 48.98		2025	\$ 2,514,158	\$ 53.66
Participating, Non-Participating, Wauwatosa, Milwaukee ↓	2010	\$ 2,140,086	\$ 32.24	Participating, Non-Participating, Wauwatosa, Milwaukee ↓	2010	\$ 2,791,624	\$ 36.70
	2015	\$ 2,457,636	\$ 36.24		2015	\$ 3,206,164	\$ 41.27
	2020	\$ 2,850,166	\$ 41.17		2020	\$ 3,713,494	\$ 46.83
	2025	\$ 3,293,953	\$ 46.69		2025	\$ 4,300,199	\$ 53.21

3.b.2 New Facility Dual and Single Stream Expected Revenues

Figure 3-1 depicts the actual average dollars per ton received from the sale of all commodities from the Waukesha County MRF 1991-2006.

Figure 3-1



➔ Over this period of time, 292,559 tons of various commodities have been sold resulting in total revenues of \$21,372,917. This equates to an average per ton value of \$73.06 and a median value of \$77.78 per ton. The high and low figures used in modeling potential revenue scenarios represent a generalized market range (+/- \$15/ton) for recyclable materials experienced by the county program during the past 10 years. The median, the high and low generalized market ranges are used to illustrate the effect of market prices upon facility operating parameters. The following table 3-6 summarizes these values.

Table 1: Typical Equipment Life Expectancy

Equipment	Life Expectancy in Years
Source of supply	
Intake Structures	35 – 45
Wells and Springs	25 – 35
Galleries and Tunnels	30 – 40
Transmission mains	35 – 40
Pumping Plants	
Structures	30 – 60
Pumping Equipment	10 – 15
Treatment Plants	
Structures	30 – 60
Equipment	10 – 15
Chlorination Equipment	10 – 15
Transmission/Distribution	
Structures	30 – 60
Reservoirs and Tanks	30 – 60
Mains & Distribution Pipes	35 – 40
Services	30 – 50
Valves	35 – 40
Backflow Prevention Valves	35 – 40
Blow-off valves	35 – 40
Meters	10 – 15
Hydrants	40 – 60
General Plant	
Structures	30 – 40
Electrical Systems	7 – 10
Equipment	10 – 15
Transportation Equipment	10
Computers	5
Stores equipment	10
Lab/Monitoring Equipment	5 – 7
Tools and Shop Equipment	10 – 15
Landscaping/Grading	40 – 60
Power operated equipment	10 – 15
Communications equipment	10

FOOTNOTE #10

The highest tonnage scenarios modeled here for both a single and dual stream tonnage would be the participating plus the non-participating municipalities in a single shift. In the year 2025 the dual stream facility would need to be able to process, just over 14 tons per hour of fiber and just over 5 tons per hour of commingled containers. The Single Stream facility would need to process approximately 23 tons per hour of total material with almost 17 being fiber and almost 6 being commingled. Based upon these calculations, we recommend that the design basis for a Dual Stream MRF be 17.5 tons per hour of fiber and 7.5 tons per hour of commingled containers. The design basis for a Single Stream MRF should be 25 tons per hour total materials, with 17.5 tons being fiber and 7.5 tons being commingled. Note that "tons per hour" design is the same for both systems. It is assumed that additional materials captured by Single Stream collection would be processed during a second shift.

Because either of the Regional MRF scenarios requires two-shift processing, any design must provide a tipping floor capable of storing materials received during normal collection hours and processed during a second shift. If the County expects the facility to operate as a regional MRF, up to 500 tons of tipping floor storage could be required by the year 2025.

3.b.1 New Facility Dual and Single Stream Operating Costs

For each of the six operating scenarios, the primary factor to operating costs over time is inflation. All operating costs have been modeled using an inflation factor of 3% per year. Over the 15-year life of the projected new MRF, this has a very measurable effect. We believe this is probably the worst case. A secondary effect on operating costs is tonnage. Per Section 1, the tonnage levels of each operating scenario changes as a result of projected population changes over time.

Single Stream operating costs are higher than Dual Stream costs. This is primarily due to the increased levels of residue in the single stream material resulting in additional labor to pre-screen incoming recyclables. Also, additional quality control personnel are needed to sort any fiber or containers that the screens do not automatically sort into the proper screen. Because of the additional screening systems required to sort fiber from containers, Single Stream Systems are more costly resulting in higher amortization costs. Single Stream systems affect labor needs in different ways; they create the need for additional labor for quality control while reducing labor relative to a Dual Stream system by automating the removal of both mixed broken glass and residue. The net effect is generally that Single Stream systems require additional personnel when compared to technologically comparable Dual Stream Systems.

While the capital costs associated with various hourly throughputs within a fairly narrow range are mostly constant, operating costs are not. Per ton Operations and Maintenance costs vary substantially in the same facility at different throughput levels. Similarly, dual and single stream operating costs also vary. Attached to this report as Appendix F are the detailed operating cost worksheets for the proposed MRF for the six operating scenarios and years, 2010, 2015, 2020, and 2025. These costs are summarized in the attached table 3-5.

MRF Equipment Pricing Data

Pirrung, Don

From: Meyers, Rick [rick.meyers@milwaukee.gov]
Sent: Thursday, August 13, 2009 12:33 PM
To: Haygood, Jill E.
Cc: Pirrung, Don
Subject: RE: Single Stream equipment cost numbers

Thanks, Jill. I have copied Don on this.
Don, if you don't get what you need, let me or Jill know. Thanks.
-Rick

From: Haygood, Jill E. [mailto:HaygooJE@co.outagamie.wi.us]
Sent: Thursday, August 13, 2009 11:46 AM
To: Meyers, Rick
Subject: Single Stream equipment cost numbers

Rick
FYI—Phil Stecker my supervisor is working with Don Piurring, a consultant I assumed you hired to get info. on pricing of single stream equipment. I hope you get all the info. you need in a timely manner, if not give me a call.

The basics of our system

BHS (Bulk Handling Systems)
Equipment Cost approximately 7.7 Million
Building Expansion 2.2 Million
25 Tons/Hour System

Process 50,000 tons annually (Residential Material from Brown, Outagamie, Winnebago), one shift 7:00am-3:30pm.

Hope this helps.

Jill Haygood
Outagamie County Recycling Coordinator
(920) 832-4710
Haygooje@co.outagamie.wi.us
"Live simple so others may simply live"

8/13/2009



Se

[Home](#) [Products](#) [Company](#) [News & Events](#) [O](#)

News & Events

[Subscribe](#)

New BHS Single Stream System Installed at Wisconsin MRF

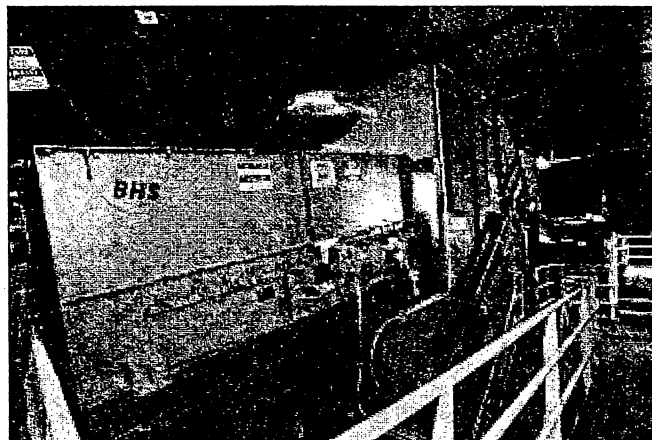
BHS has completed the installation of a state-of-the-art 25 tph single stream sorting system at the new Material Recovery Facility (MRF) in Outagamie County, Wisconsin. The MRF is a joint effort of three counties – Brown, Outagamie, and Winnebago – and was built to process material from the new single stream program developed by the three counties. The program is expected to generate greater volumes of recyclable materials and divert these materials from landfill.

The three county single stream program combines paper with plastic, glass and metal recyclables. Phil Stecker, Director of Solid Waste for Outagamie County, said the new MRF launches a new era of recycling for 500,000 people in more than 60 Brown-Outagamie-Winnebago communities. He hopes the new program will reduce complications for residents and encourage greater community participation in recycling.

The Outagamie County MRF sets the new standard for single stream processing, incorporating the latest in screening, optical, and air separation technologies. The BHS single stream system is designed to maximize the recovery of marketable commodities, yielding minimal residual material and reducing disposal costs. Designed, manufactured and installed by BHS, the system focuses on the reduction of operating costs by optimizing integrated processes to emphasize mechanization and the extraction of recoverable materials on the first "pass". As a result, the products produced by the system are high in quality, the cost to process material is low, and the capture rate of high value materials is virtually 100% with extremely low residue values.

As reported by the Appleton Post Crescent, the approval of the facility by the Outagamie County Board of Supervisors will allow the cost of the new facility to be shared between Brown, Outagamie and Winnebago Counties, all of which currently participate in a tri-county agreement for solid waste and recycling processing. Moving recycling from the dual stream system, in which paper is collected separately, to a single stream collection is another way the tri-county agreement best meets the needs of the region.

BHS designs, manufactures and installs processing systems to efficiently extract recoverable materials from waste streams, thus minimizing residual volumes sent to landfills and preserving precious natural resources through demonstrated carbon footprint reduction capabilities. The Eugene, Oregon USA based company is the leading supplier of processing systems for the solid waste, recycling, forest products and power generation industries and continues to develop new generation products and systems, while adding to an extensive list of patented technologies.



Purchasing Division

County Administration Building
300 Monroe Avenue NW
Grand Rapids, MI 49503-2289, USA
Phone: (616) 632-7720
Fax: (616) 632-7715
e-mail: purchasing@kentcountymi.gov

Kent County Purchasing is a division of the Fiscal Services Department. The Purchasing Division's primary responsibility is to serve the needs of the departments of Kent County in a timely, efficient, and cost-effective manner while complying with the federal, state and local laws and regulations of the Board of Commissioners.

The Division operates with the best interest of the tax paying public in mind and is held to the highest professional standard. The National Association of Purchasing Managers (NAPM) lists 12 principles or standards that purchasing professionals should follow. The Kent County standards as well as the policies established by the Board of Commissioners.

The Division encourages broad-based participation through a fair and open competitive process.

From: Dennis Kmiecik
To: Brinks, Calvin
Date: 8/7/2009 11:54 AM
Subject: Cal,

Cal,

Here is the breakdown for the new MRF:

Building: \$6,388,296.50
Equipment: \$4,727,185.00
Baler: \$478,250.00
Construction Management: \$303,144.27
Land: (5 acres) na

Total\$11,896,875.77

Dennis

Dennis Kmiecik, P.E.
Dept. of Public Works - Kent County, MI
PH 616-336-4369 FX 616-336-3338

This message has been prepared on resources owned by Kent County, MI.
It is subject to the Acceptable Use Policy of Kent County.

MRF Equipment Vendor and Trade References

Jerry Flickinger
Equipment Sales Manager
JWR Inc.
PO box 356
Johnson Creek WI 53038
Cell Phone: 920-988-0538
Office Phone: 888-699-2848
Office Fax: 920-699-2847
Website: www.jwrinc.net

Jerry Flickinger provided cost information on Single Stream processing equipment.

Matz, Paul

From: Jerry Flickinger [jerry@jwrinc.net]
Sent: Friday, August 14, 2009 9:23 AM
To: Matz, Paul
Subject: RE: Automation Question

Hi Paul,

Sorry for the delay in getting back to you on this. Here is what I have.

Estimated cost for the following equipment that will process 20 tons per hour would be \$6,000,000 to \$7,000,000. This would require a second shift if they achieve the 80,000 ton level.

Infeed metering hopper for bulk loading of materials.

Main infeed conveyor.

Pre-sort station.

Trommell screen for glass and fines.

OCC screen.

Three Ballistic Separators. (These units are used to separate paper, containers, and fines.) Optical sort for both fiber and plastic.

Shaker conveyor for additional removal of fines and broken glass.

Magnet for removal of steel cans and other metals.

Eddy current separator for aluminum.

All related platforms, railings, stairs, and sorting station conveyors.

In addition to this, estimated mechanical installation costs will be right at 15% of the final total equipment cost. Estimated electrical installation costs will run right at 10% of the equipment total.

At this volume, I would recommend a 2 baler system, one for fiber, and one for containers. Both machines would be able to crossover and process the other materials in emergencies so this gives you a back up if one baler is down, and would not cost a lot more than the one huge baler it would take to handle this volume. The balers will add an additional \$800,000 including installation.

Estimated staffing for this system is 26 on the sorting stations, plus another 5 to 7 on rolling stock.

Estimated minimum building size to accommodate this equipment is 200' by 300'.

As for life span, that is a VERY tricky question. It is so dependent on the volume and cleanliness of the incoming material, and the quality of maintenance that is done that it's hard to estimate. IF it is maintained properly, 10 to 12 years is not out of the question, but in those 10 to 12 years you would need to figure on replacing some conveyor belts and drives, relining balers, and rebuilding cylinders.

I hope this gives you what you need. Call me if you have any questions.

-----Original Message-----

From: Matz, Paul [mailto:Paul.Matz@aecom.com]
Sent: Wednesday, August 12, 2009 1:23 PM
To: Jerry Flickinger
Subject: RE: Automation Question

Jerry,

Just checking in...Do you plan to send me any type of budget costs?

One additional question:

If you were to put a time estimate on the life span of the MRF equipment what would it be? If I had to make a educated guess I would say that it is 10-15 years.

Matz, Paul

From: Matz, Paul
Sent: Friday, August 07, 2009 9:35 AM
To: 'Jerry Flickinger'
Cc: Pirrung, Don
Subject: RE: Compactor Information

Jerry:

Thanks for the follow-up phone call.

As we discussed, I am currently working on a project for the City of Milwaukee.

The city is in the process of evaluating their current recycling capabilities and their future options. AECOM has been hired to develop a report that summarizes their options.

The report that we are writing is not intended to be a detailed cost study. The cost data that we will document in the report will provide the city with budget numbers, so that they can evaluate which options they should pursue in more detail. This is not a formal Request for Quote. Without going into great detail, their options are:

1. Build a new Single Stream MRF for their recyclables only
2. Partner with some of the surrounding communities and build a new Single Stream MRF for a larger volume of recyclables
3. Build a new Transfer Facility and continue to send their recyclables to a privately owned MRF

To that end I would like to request your assistance with "budget numbers" for the first two options. The figures presented should be for the installed cost of all of the "process equipment". These numbers can be presented in a range, a unit price, or whatever format makes you the most comfortable to convey this type of data. I recognize that there are a lot of variables so let me bracket your estimate with some assumptions.

Assumptions

- Assume current "state of the art" for a single stream system. This would include all of the latest optical sorting for plastics, material detection, etc.
- Assume that a new facility would be constructed in the existing facility but all the necessary modifications would be made so that necessary space, grading, building, utilities, etc. would be available, and your firm would participate in the design of the facility.
- Use current pricing. We reorganize that these prices are time, and material cost sensitive.
- The design capacity of the facility shall be as follows:

Option 1	30,000 tons/year
Option 2	81,000 tons/year

- The make up of the recyclable materials is:

Commodity	Composition %
Newspaper #8 (including phone books and magazines)	61.17
Corrugated	7.58
Office Mix Paper	0.59
FE / Tin	2.58
Aluminum	1.49
HDPE Natural	1.81
HDPE Colored	1.52
PET	4.70
Green Glass	2.13

Amber Glass	0.78
Flint Glass	1.4
Mixed Glass	14.17
Scrap Metal	.04

- The recyclables will come in either compacted in transfer vehicles or in the collection trucks themselves.

Any additional information that you can provide like brochures, generic drawings, material lists, building/site layout requirements, operating cost data, etc. would be greatly appreciated. It is my intention to include this letter and a copy of all documentation that you provide in an Appendix to the report.

I will be compiling the data that over the next week so I would like to have you numbers no later the COB in Wednesday August 12.

Please feel free to contact me if you have any questions.

Thank you in advance for your assistance.


Paul Matz

Project Engineer

AECOM Environment

D: 920.451.2751 C: 920.698.2444

This communication is intended for the sole use of the person(s) to whom it is addressed and may contain information that is privileged, confidential or subject to copyright. Any unauthorized use, disclosure or copying of this communication is strictly prohibited. If you have received this communication in error, please contact the sender immediately. Any communication received in error should be deleted and all copies destroyed.

 Please consider the environment before printing this e-mail

From: Jerry Flickinger [mailto:jerry@jwrinc.net]

Sent: Thursday, August 06, 2009 4:12 PM

To: Matz, Paul; Mike Shawgo

Cc: David Wolf

Subject: RE: Compactor Information

Hello Paul,

As Mike has mentioned, JWR offers service and sales of all types of recycling equipment including balers, conveyors, shredders, and sorting equipment. If the new project may involve any of these types of equipment, we would greatly appreciate the opportunity to speak with you. I have been selling recycling equipment for over 10 years and JWR has been servicing this kind of equipment for over 25 years.

Please let me know if there is anything we can help you with.

Jerry Flickinger
Sales Manager
JWR Inc.

You can visit us on the web at www.jwrinc.net

From: Matz, Paul [mailto:Paul.Matz@aecom.com]

Sent: Thursday, August 06, 2009 10:14 AM

To: Mike Shawgo

Cc: Jerry Flickinger; David Wolf

Subject: Compactor Information

Mike,

Got your e-mail.

Thanks for the information and the follow-up.

I will use \$150K as an installed budget price for a compactor.

8/25/2009

I look forward to receiving the Sebright information.


Paul Matz

Project Engineer

AECOM Environment

D: 920.451.2751 C: 920.698.2444

This communication is intended for the sole use of the person(s) to whom it is addressed and may contain information that is privileged, confidential or subject to copyright. Any unauthorized use, disclosure or copying of this communication is strictly prohibited. If you have received this communication in error, please contact the sender immediately. Any communication received in error should be deleted and all copies destroyed.

 Please consider the environment before printing this e-mail

From: Mike Shawgo [mailto:mshawgo@steppequipment.com]

Sent: Thursday, August 06, 2009 9:52 AM

To: Matz, Paul

Cc: Jerry Flickinger; David Wolf

Subject: City of Milwaukee

Paul...I will get you some info from Sebright, Jerry and Dave at JWR are my expert resources on the baler and conveyor end. Please stay in touch...Mike

Sincerely,

Mike Shawgo

General Manager

Stepp Equipment Company

N58 W14810 Shawn Circle

Menomonee Falls WI 53051

262-252-5500 p

262-252-5519 f

414-881-0336 c

Visit our recently updated website @ www.steppequipment.com!

Pirrung, Don

From: Rutta, Travis
Sent: Wednesday, June 09, 2010 9:26 AM
To: Pirrung, Don
Subject: New Berlin Property Costs

Don,
FYI/for the project records, here are my notes and contact information for the realtor I spoke with about the New Berlin industrial park.

NAI MLG Commercial
www.mlgcommercial.com
John Mccardle
(262) 797-9400
Their office is in Brookfield, WI.

Mr. Mccardle estimated that 5 acres of vacant land in the New Berlin Industrial Park would go for \$150-200,000/acre. He also stated that there is not 5 acres of vacant land available in the industrial park and that property prices decline steeply when you leave the industrial park.

Based on a search of the MLG commercial website there are a few properties nearby going for \$75,000/acre (Calhoun & Coffee Roads) and \$200,000/ac (Calhoun and W. National Ave.). The information on the two properties and this e-mail will be saved in the project directory.

Travis Rutta, P.E.
Design Engineer
Environment
D 920-451-2517
travis.rutta@aecom.com

AECOM
4135 Technology Parkway, Sheboygan, WI 53083
T 920-458-8711 F 920-458-0550
www.aecom.com

This communication is intended for the sole use of the person(s) to whom it is addressed and may contain information that is privileged, confidential or subject to copyright. Any unauthorized use, disclosure or copying of this communication is strictly prohibited. If you have received this communication in error, please contact the sender immediately. Any communication received in error should be deleted and all copies destroyed.

Transfer Facility Equipment Pricing Data

Transfer Facility Vendor and Trade References

Mike Shawgo
General Manager
Stepp Equipment Company
N58 W14810 Shawn Circle
Menomonee Falls WI 53051
Cell Phone: 414-881-0336
Office Phone: 262-252-5500
Office Fax: 262-252-5519
Website: milwaukee@steppequipment.com

Mike Shawgo provided cost information on Transfer Station equipment, and equipment life expectancies.

Matz, Paul

From: Mike Shawgo [mshawgo@steppequipment.com]
Sent: Wednesday, August 12, 2009 5:52 PM
To: Matz, Paul
Subject: RE: Compactor Information

Paul... These are hypothetical, but should give you a starting point ..Mike

From: Matz, Paul [mailto:Paul.Matz@aecom.com]
Sent: Wednesday, August 12, 2009 4:49 PM
To: Mike Shawgo
Subject: RE: Compactor Information

Good information Mike.

Thanks again!!

If you have some knowledge of a particular piece of equipment, please let me know your opinion where I have ??

Commodity	Life Expectancy
Buildings and Grounds	40 years
Single Stream Process Equipment	20 years
Compactor	10-15 years
Transfer Trailers	10-15
Semi Tractor	10 -15
Yard Truck	15 years
Front End Loader	15 years

Paul Matz
Project Engineer
AECOM Environment
D: 920.451.2751 C: 920.698.2444

This communication is intended for the sole use of the person(s) to whom it is addressed and may contain information that is privileged, confidential or subject to copyright. Any unauthorized use, disclosure or copying of this communication is strictly prohibited. If you have received this communication in error, please contact the sender immediately. Any communication received in error should be deleted and all copies destroyed.

 Please consider the environment before printing this e-mail

From: Mike Shawgo [mailto:mshawgo@steppequipment.com]
Sent: Wednesday, August 12, 2009 4:42 PM
To: Matz, Paul
Subject: RE: Compactor Information

10-15 years, depending on tonnage processed and the type of material.


From: Matz, Paul [mailto:Paul.Matz@aecom.com]
Sent: Wednesday, August 12, 2009 4:29 PM
To: Mike Shawgo
Subject: RE: Compactor Information

Mike:
What is the life expectancy of a compactor assuming proper maintenance?
Same question for a trailer?

Paul Matz

Project Engineer
AECOM Environment
D: 920.451.2751 C: 920.698.2444

This communication is intended for the sole use of the person(s) to whom it is addressed and may contain information that is privileged, confidential or subject to copyright. Any unauthorized use, disclosure or copying of this communication is strictly prohibited. If you have received this communication in error, please contact the sender immediately. Any communication received in error should be deleted and all copies destroyed.

 Please consider the environment before printing this e-mail

From: Mike Shawgo [mailto:mshawgo@steppequipment.com]
Sent: Friday, August 07, 2009 8:50 AM
To: Matz, Paul
Subject: RE: Compactor Information

Paul....Pricing on the transfer trailers, which must be steel and compactor compatible, will range from \$90,000-110,000. Also, there is a state law which allows more payload if the hauler is hauling compacted waste. That is the reason transfer compactors are so popular in Wisconsin. It is a permitted allowance, Wisconsin Statute 348.27, any Wisconsin DOT office can get you the info. ...Mike

From: Matz, Paul [mailto:Paul.Matz@aecom.com]
Sent: Thursday, August 06, 2009 3:09 PM
To: Mike Shawgo
Subject: RE: Compactor Information

Mike:

When we talked this morning you mentioned that you had some knowledge of the price of a trailer that would work with the compactor.

You and I both agree that it is probably best for the city contract this service, but they have requested that we estimate the cost of trailers, so if you can provide any insight to these costs it would also be appreciated.

Thanks,

Paul Matz

Project Engineer
AECOM Environment
D: 920.451.2751 C: 920.698.2444

This communication is intended for the sole use of the person(s) to whom it is addressed and may contain information that is privileged, confidential or subject to copyright. Any unauthorized use, disclosure or copying of this communication is strictly prohibited. If you have received this communication in error, please contact the sender immediately. Any communication received in error should be deleted and all copies destroyed.

 Please consider the environment before printing this e-mail


From: Matz, Paul
Sent: Thursday, August 06, 2009 10:14 AM
To: 'Mike Shawgo'
Cc: Jerry Flickinger; David Wolf
Subject: Compactor Information

Mike,
Got your e-mail.
Thanks for the information and the follow-up.
I will use \$150K as an installed budget price for a compactor.
I look forward to receiving the Sebright information.

Paul Matz

Project Engineer
AECOM Environment
D: 920.451.2751 C: 920.698.2444

This communication is intended for the sole use of the person(s) to whom it is addressed and may contain information that is privileged, confidential or subject to copyright. Any unauthorized use, disclosure or copying of this communication is strictly prohibited. If you have received this communication in error, please contact the sender immediately. Any communication received in error should be deleted and all copies destroyed.

 Please consider the environment before printing this e-mail

From: Mike Shawgo [mailto:mshawgo@steppequipment.com]
Sent: Thursday, August 06, 2009 9:52 AM
To: Matz, Paul
Cc: Jerry Flickinger; David Wolf
Subject: City of Milwaukee

Paul...I will get you some info from Sebright, Jerry and Dave at JWR are my expert resources on the baler and conveyor end. Please stay in touch...Mike

Sincerely,

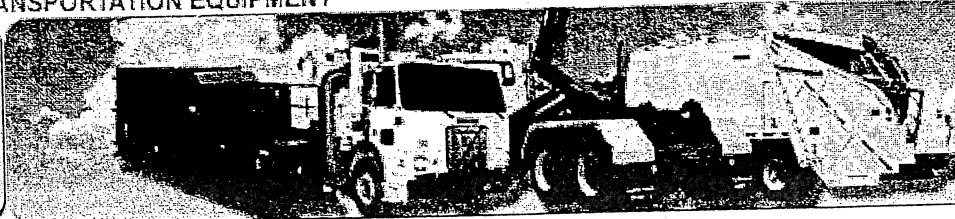
Mike Shawgo
General Manager
Stepp Equipment Company
N58 W14810 Shawn Circle
Menomonee Falls WI 53051
262-252-5500 p
262-252-5519 f
414-881-0336 c

Visit our recently updated website @ www.steppequipment.com!

IL 708-458-7
WI 262-252-5

INDUSTRIAL MATERIAL HANDLING & TRANSPORTATION EQUIPMENT

STEPP
Equipment Company



[Home](#) | [About](#) | [Products](#) | [Parts](#) | [Contact](#)

Illinois

Wisconsin

[Select a Product](#)

Welcome to Stepp Equipment

 **Online Parts Store**

Stepp Equipment provides superior service for both refuse bodies and stationary refuse compactors. We specialize in 24-hour service for our refuse compactor customers. In addition, Stepp Equipment stocks parts for most major manufacturers of refuse compactors, refuse bodies, and roll-off equipment. We specialize in fast and efficient delivery of refuse parts throughout the Midwest.

Stepp Equipment is an authorized distributor for manufacturers such as East, Galbreath, Labrie, Leach, Pioneer, Sebright and many others.

Stepp Equipment has two convenient locations to serve you – Chicago, IL and Menomonee Falls, WI.



CHICAGO, ILLINOIS



MENOMONEE FALLS, WISCONSIN

Illinois Location

5400 Stepp Drive
Summit, IL 60501
Phone: 708-458-7800
Fax: 708-458-1031
chicago@steppequipment.com
[View Map For This Location](#)

Wisconsin Location

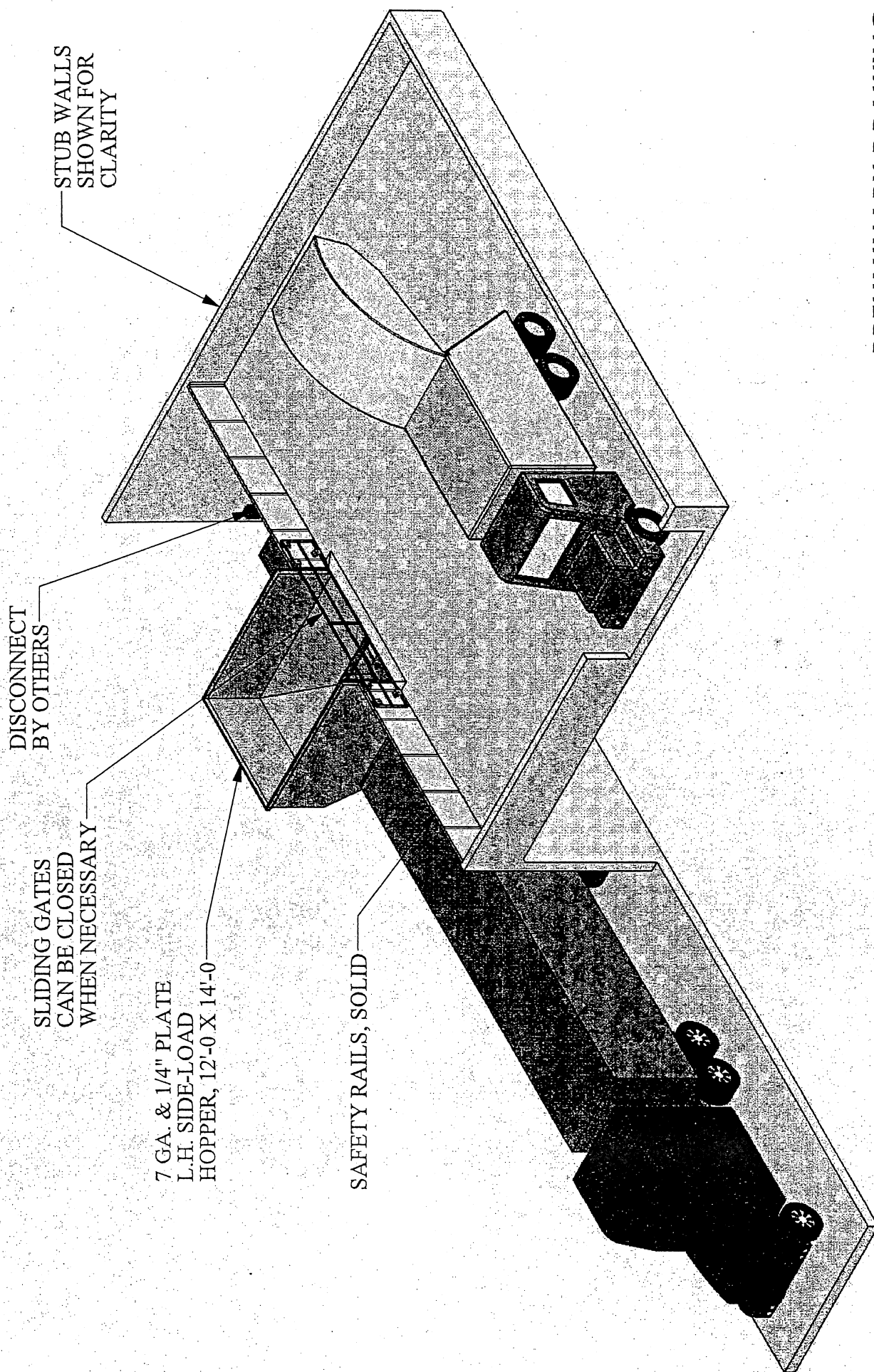
N58 W14810 Shawn Circle
Menomonee Falls, WI 53051
Phone: 262-252-5500
Fax: 262-252-5519
milwaukee@steppequipment.com
[View Map For This Location](#)

[Home](#) | [About](#) | [Products](#) | [Parts](#) | [Contact](#) | [Sitemap](#)

[Select a Product](#)



© Copyright Stepp Equipment Company 2009 | All Rights Reserved | Designed By Website A



PRELIMINARY DRAWING
NOT FOR CONSTRUCTION

TITLE: **GENERIC TRANSFER STATION LAYOUT USING A 12084 COMPACTOR**

SEBRIGHT PRODUCTS INC.
127 N. WATER ST. HOPKINS, MI 49328
PH 269-793-7183 / www.sebrightproducts.com

CUSTOMER NAME:	DYNAMIC TRUCK & EQUIPMENT CO.	
WEIGHT (LBS):	SCALE: 1-120	SHEET SIZE: A DWG #:

0561

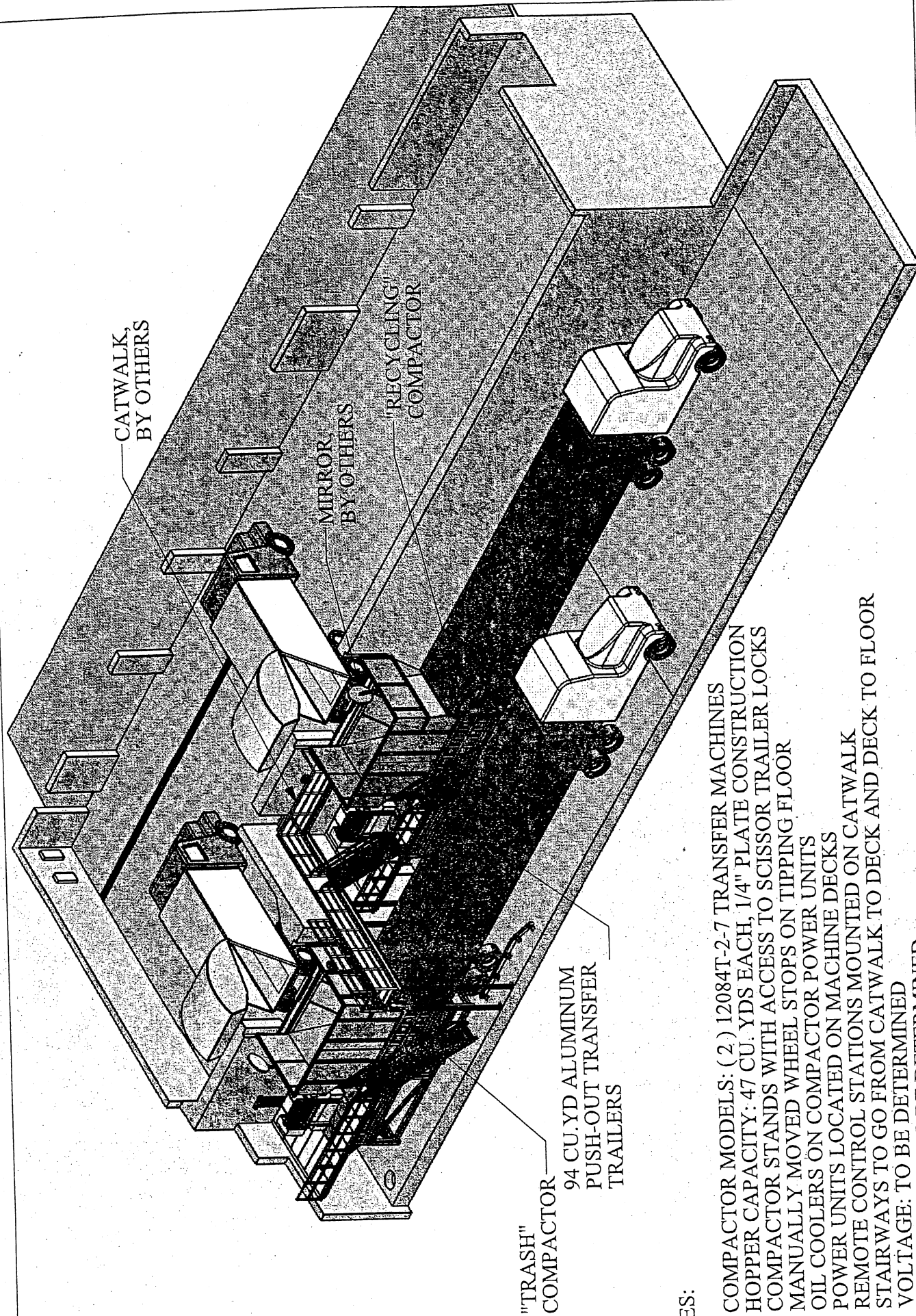
SER. NO.: N/A

N/A
MATERIAL:

SHEET 2 OF 5	TOLERANCE (UNLESS SPECIFIED) FRACTIONS ± 1/16" XXXXX ± .0625" ANGLES ± 0°30'
--------------	--

DRAWING LEGEND - CONFIDENTIAL

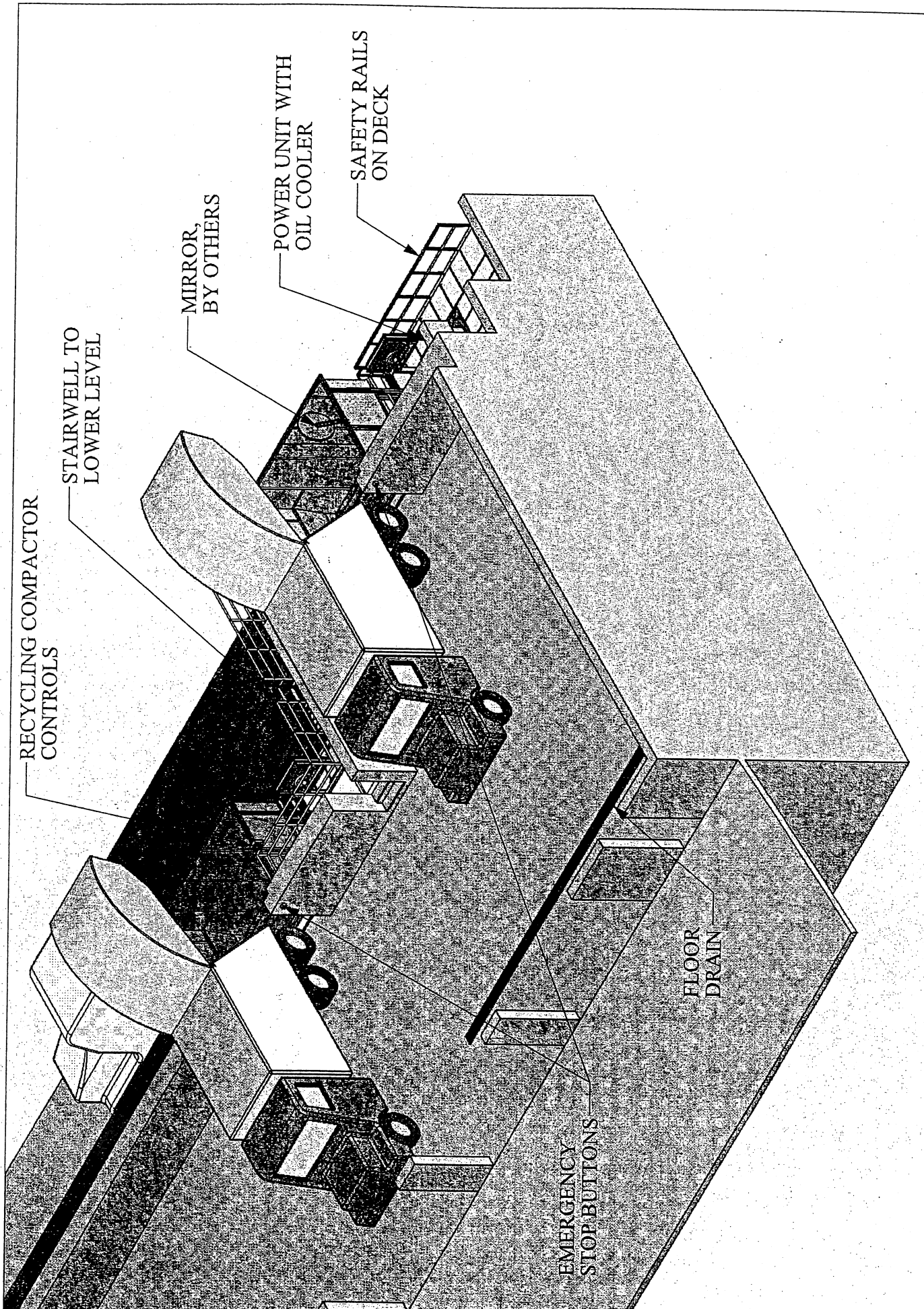
DATE: 9-10-07	REVISION:	DRAWN BY: BB	STATUS:
This drawing is the sole property of Seibrigh Products Inc. and contains confidential proprietary information. All rights in this drawing are reserved by Seibrigh Products Inc. and the contents thereof may not be reproduced, used or disclosed to others for any other purpose without the express written consent of Seibrigh Products Inc. and the drawing must be returned to Seibrigh Products Inc. when the specific purpose for which it was created has been completed.			



NOTES:

1. COMPACTOR MODELS: (2) 12084T-2-7 TRANSFER MACHINES
2. HOPPER CAPACITY: 47 CU. YDS EACH, 1/4" PLATE CONSTRUCTION
3. COMPACTOR STANDS WITH ACCESS TO SCISSOR TRAILER LOCKS
4. MANUALLY MOVED WHEEL STOPS ON TIPPING FLOOR
5. OIL COOLERS ON COMPACTOR POWER UNITS
6. POWER UNITS LOCATED ON MACHINE DECKS
7. REMOTE CONTROL STATIONS MOUNTED ON CATWALK
8. STAIRWAYS TO GO FROM CATWALK TO DECK AND DECK TO FLOOR
9. VOLTAGE: TO BE DETERMINED
10. PAINT COLOR: TO BE DETERMINED

DATE: 8/1/2009		REVISION:	DRAWN BY: JL	SHEET 1 OF 13	TITLE: GENERIC SALES LAYOUT	
DRAWING LEGEND - CONFIDENTIAL This drawing is the sole property of Sebright Products Inc. and contains confidential proprietary information. All rights in this document and in the information contained herein are reserved by Sebright Products Inc. The document is provided for a specific purpose, and the information contained herein may not be reproduced, used or disclosed to others for any other purpose without the written consent of Sebright Products Inc. and the drawing must be returned to Sebright Products Inc. when the specific purpose is completed.					CUSTOMER NAME: SEBRIGHT PRODUCTS INC. 127 N. WATER ST. HOPKINS, MI 49328 PH 269-793-7183 / www.sebrightproducts.com	
TOLERANCE (UNLESS SPECIFIED) FRACTIONS .XXXX ANGLES ±0°30'		SCALE: 1:192 SHEET SIZE: A WEIGHT (LBS.): MATERIAL:				
		DWG #: 8497 SER. NO.:				



DATE: 8/7/2009		REVISION:	DRAWN BY: JL	SHEET 2 OF 13	TITLE: GENERIC SALES LAYOUT SEBRIGHT PRODUCTS INC. 127 N. WATER ST. HOPKINS, MI 49328 PH 269-793-7183 / www.sebrightproducts.com	
DRAWING LEGEND - CONFIDENTIAL This drawing is the sole property of Sebright Products Inc. and is to be used for the specific purpose for which it was prepared. It is not to be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the prior written consent of Sebright Products Inc. and the drawing must be returned to Sebright Products Inc. when the specific purpose is completed.				TOLERANCE (UNLESS SPECIFIED) FRACTIONS $\pm 1/16"$ DECIMALS $\pm 0.031"$ ANGLES $\pm 0.75^\circ$		
CUSTOMER NAME:		WEIGHT (LBS):		SCALE: 1:128	SHEET SIZE: A	DWG #: 8497
MATERIAL:		SER. NO.:				

Pirrung, Don

From: bmcginnis@tswa.com [mcginnis.barry@gmail.com] on behalf of Barry McGinnis [bmcginnis@tswa.com]
Sent: Friday, June 18, 2010 3:09 PM
To: Pirrung, Don
Subject: tWeigh Un-Attended Scale Management System
Attachments: brochure-tweighserver.pdf; Brochure-bar-card-RFID.pdf; Example Pics.pdf; tPanel FeatureSet.pdf; tswa-lit - tWeigh Panel.pdf; tswa-Brochure-bar-card-TSW.pdf

Don,

Thanks for your inquiry this morning.

I understand that you need a budgetary price for a tWeigh Un-Attended truck In/Out system for an existing Truck Scale at a Transfer Station..

As per our discussion, the budgetary price provides for the following Equipment.

Network based tWeigh Server package to run on existing Scale House PC, scale and indicator. (see attached docs) Serial weight data will be provided to the system via a TSWA t500 serial to Ethernet (10BT) converter.

Driver height kiosk (tPanel) for Un-attended driver input including:

- Color touch screen display
- Vandal resistant Stainless Steel keyboard
- RFID Card driver identification reader
- Network based intercom
- (2) IP based video Cameras to take digital snapshots of load
- Camera monitoring and control software.
- Network Fiber converter and switch
- 80mm Ticket printer for driver receipt.
- Pole mounting kit for tPanel Mount

Budgetary price \$ 33,920.00

ADD INSTALLATION \$ 26,080
& DESIGN

This number does not include on-site installation.

Please give me a call if you have any questions.

Thanks for your interest.

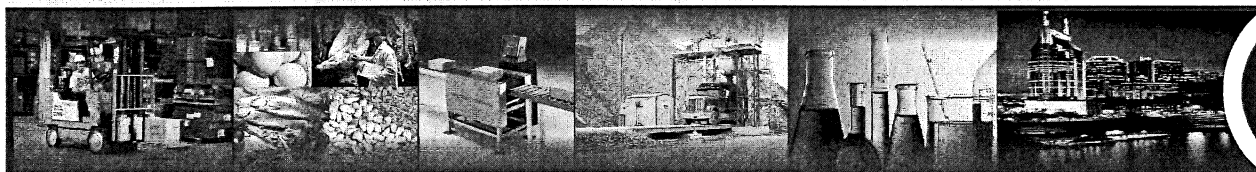
--

Barry McGinnis
TSW Automation, Inc
6301 Robertson, Ave.
P.O. Box 91000
Nashville, TN 37209
PH: 615-356-8785 x 204
FX: 615-356-8744
bmcginnis@tswa.com
www.tswa.com

→

TOTAL \$ 60,000

Est. Installed & Equipment
Price



t-Weigh Product Profile

Scale-based Materials
Shipping and Receiving

Process Transactions with
Speed and Accuracy

Maintain Empty Truck
Weight Database

Multiple Truck Scale Support

Comprehensive Reporting

NTEP Certified Legal for Trade

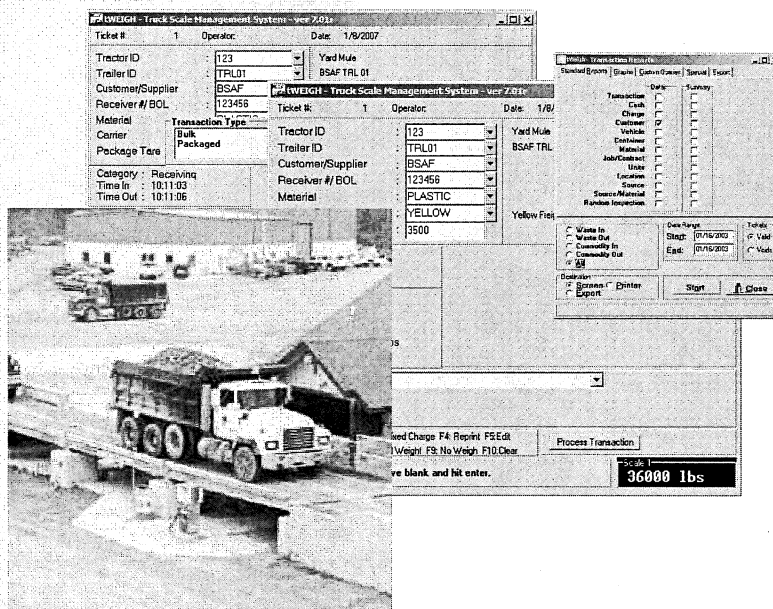
Attended and Un-Attended
Operation

Wired or Wireless Ethernet
Connectivity

Interface Scales or Printers
to Remote Data Center

Networked Camera pictures
can be stored with ticket data.

Automatic E-Mail Receipt
Notifications



tWeigh truck scale management system

The **tWeigh** System makes use of the Windows Operating System to provide one of the fastest, easiest to use, and most comprehensive truck scale data management system available on the market today. It is compatible with current Microsoft Windows® Operating Systems, including Windows 2000/XP, and Vista.

Loaded with features, the **tWeigh** System provides truck scale users with all of the tools needed to quickly process truck weighing, process inbound/outbound truck transactions, capture essential transaction information and provide powerful reporting capabilities.

While powerful, the **tWeigh** System is designed for maximum ease of use, with intuitive screens and short-cut keys to speed up all operations and to reduce operator training time.

Versions of the **tWeigh** Truck Scale Management System are available for single user sites, network sites, unattended operation, waste/recycling, aggregate, and agriculture harvesting, allowing users to select the system best suited for local operational requirements.

The **tWeigh** Truck Scale Management System delivers the most complete feature set available. Whether your application involves landfills, recycling, stone and aggregate processing, asphalt, agricultural, chemical, food and general industrial applications, **tWeigh** will help you manage your business more effectively. Also, the system is configurable to work with most truck scale brands and models in the field.

Remote management features allow you to support multiple un-attended remote scale sites from one location via your existing network.

For a more complete features list and product specifications please visit "www.tswa.com/tweigh".



tweigh

Appendix H

Labor and Maintenance/Fuel Costs for City of Milwaukee

Pirrung, Don

From: Booker, Wanda [Wanda.Booker@milwaukee.gov]
Sent: Wednesday, August 13, 2008 3:13 PM
To: Pirrung, Don
Cc: Meyers, Rick; Purko, James
Subject: FW: Recycling Proposal
Attachments: rates_recycling study_earthtech.xls

Don -

See rates you requested attached. I need a copy of your proposal to attach to the service order. Let me know what other information you need.

Booker, Wanda

Operations Driver Worker

hourly rate (adjusted to 2008)	22.90
Indirect Salary (2008)	6.86
Fringe Benefit (2008)	13.75
Overhead (2008)	<u>3.06</u>
Total Hourly Rate	46.58

Recycling Packer

annual maintenance	10,714.56
annual fuel (13 gal/day, \$4/gal)	12,896.00
hourly maint/fuel	11.20

purchase price	223,500.00
expected life (years)	11

Appendix I

Waukesha County Recyclables Collection Area Served by Veolia

DAILY RECYCLING COMMUNITY WORKSHEET

1

RECYCLING ROUTE	COMMUNITY	DAY	SERVICE TYPE	TRUCK TYPE	AVERAGE # LOADS	
1801	C NEW BERLIN	MON	PRIVATE (CURB/UPDRIVE)	BK / SCOOTERS	1 1/2	
1802	C NEW BERLIN	MON	PRIVATE (CURB/UPDRIVE)	BK / SCOOTERS	2	
1803	C NEW BERLIN	MON	PRIVATE (CURB/UPDRIVE)	BK / SCOOTERS	1 1/4	
1804	C NEW BERLIN	MON	PRIVATE (CURB/UPDRIVE)	BK / SCOOTERS	1 1/4	
1807	T LISBON	MON	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/2	
1811	T DELAFIELD	MON	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1	
1812	V DOUSMAN	MON	CONTRACT CURB	SIDELOADER	1	
1813	C NEW BERLIN	MON	PRIVATE (CURB/UPDRIVE)	BK / SCOOTERS	1	
1814	T DELAFIELD	MON	CONTRACT CURB	BK / SCOOTERS	1 1/4	
1816	T LISBON	MON	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/2	
1853	C BROOKFIELD	MON	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/4	
1854	C BROOKFIELD	MON	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/4	
1855	C BROOKFIELD	MON	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/4	
1862	C WAUKESHA	MON	CONTRACT CURB	BK / SCOOTERS	2	
1864	V ELM GROVE	MON	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/4	
1869	C WAUKESHA	MON	CONTRACT CURB	SIDELOADER	1 1/2	
1870	C WAUKESHA	MON	CONTRACT CURB	SIDELOADER	1 1/2	
1871	C WAUKESHA	MON	CONTRACT CURB	SIDELOADER	1 1/2	

18

DAILY RECYCLING COMMUNITY WORKSHEET

2

RECYCLING ROUTE	COMMUNITY	DAY	SERVICE TYPE	TRUCK TYPE	AVERAGE # LOADS	
2801	C NEW BERLIN	TUES	PRIVATE (CURB/UPDRIVE)	BK / SCOOTERS	1 1/4	
2803	C NEW BERLIN	TUES	PRIVATE (CURB/UPDRIVE)	BK / SCOOTERS	1 1/4	
2804	C NEW BERLIN	TUES	PRIVATE (CURB/UPDRIVE)	BK / SCOOTERS	1 1/2	
2805	C NEW BERLIN	TUES	PRIVATE (CURB/UPDRIVE)	BK / SCOOTERS	1 1/2	
2806	C NEW BERLIN	TUES	PRIVATE (CURB/UPDRIVE)	BK / SCOOTERS	1 1/2	
2819	T DELAFIELD/ C PEWAUKEE	TUES	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1	
2820	C DELAFIELD	TUES	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/4	
2821	T DELAFIELD/ V HARTLAND	TUES	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1	
2822	C OCONOMOWOC	TUES	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/2	
2823	C OCONOMOWOC	TUES	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/4	
2824	C OCONOMOWOC	TUES	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/2	
2853	C BROOKFIELD	TUES	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/2	
2854	C BROOKFIELD	TUES	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/2	
2855	C BROOKFIELD	TUES	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/2	
2860	T WAUKESHA	TUES	CONTRACT (CURB/UPDRIVE)	SIDELOADER	1	
2861	T WAUKESHA	TUES	CONTRACT (CURB/UPDRIVE)	SIDELOADER	1	
2862	C WAUKESHA	TUES	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1	
2869	C WAUKESHA	TUES	CONTRACT (CURB/UPDRIVE)	SIDELOADER	1 1/4	
2870	C WAUKESHA	TUES	CONTRACT (CURB/UPDRIVE)	SIDELOADER	1 1/4	
2871	C WAUKESHA	TUES	CONTRACT (CURB/UPDRIVE)	SIDELOADER	1 1/4	
2840	HARTLAND	Tues	"	"	1	
2841	HARTLAND	Tues	"	"	1	

22

DAILY RECYCLING COMMUNITY WORKSHEET

3

RECYCLING ROUTE	COMMUNITY	DAY	SERVICE TYPE	TRUCK TYPE	AVERAGE # LOADS	
3817	C DELAFIELD	WED	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/4	
3821	V HARTLAND / V WALES	WED	CONTRACT CURB	BK / SCOOTERS	1	
3822	C OCONOMOWOC	WED	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/2	
3829	T BROOKFIELD	WED	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/4	
3830	C DELAFIELD / V NASHOTAH	WED	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/4	
3831	V MERTON	WED	CONTRACT CURB	SIDELOADER	1 1/4	
3832	T BROOKFIELD	WED	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/4	
3833	T BROOKFIELD / C PEWAUKEE	WED	CONTRACT CURB	BK / SCOOTERS	1 1/2	
3835	C OCONOMOWOC / V LAC LA BELLE	WED	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/2	
3840	V HARTLAND / V WALES	WED	CONTRACT CURB	SIDELOADER	1	
3841	HARTLAND / WALES	WED	CONTRACT CURB	SIDELOADER	1	
3853	C BROOKFIELD	WED	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/2	
3854	C BROOKFIELD	WED	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/2	
3855	C BROOKFIELD	WED	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/2	
3862	C WAUKESHA	WED	CONTRACT CURB	BK / SCOOTERS	1	
3864	V ELM GROVE	WED	CONTRACT (CURB/UPDRIVE)	BK / SCOOTERS	1 1/4	
3869	C WAUKESHA	WED	CONTRACT CURB	SIDELOADER	1 1/4	
3870	C WAUKESHA	WED	CONTRACT CURB	SIDELOADER	1 1/4	
3871	C WAUKESHA	WED	CONTRACT CURB	SIDELOADER	1 1/4	

19

DAILY RECYCLING COMMUNITY WORKSHEET

4

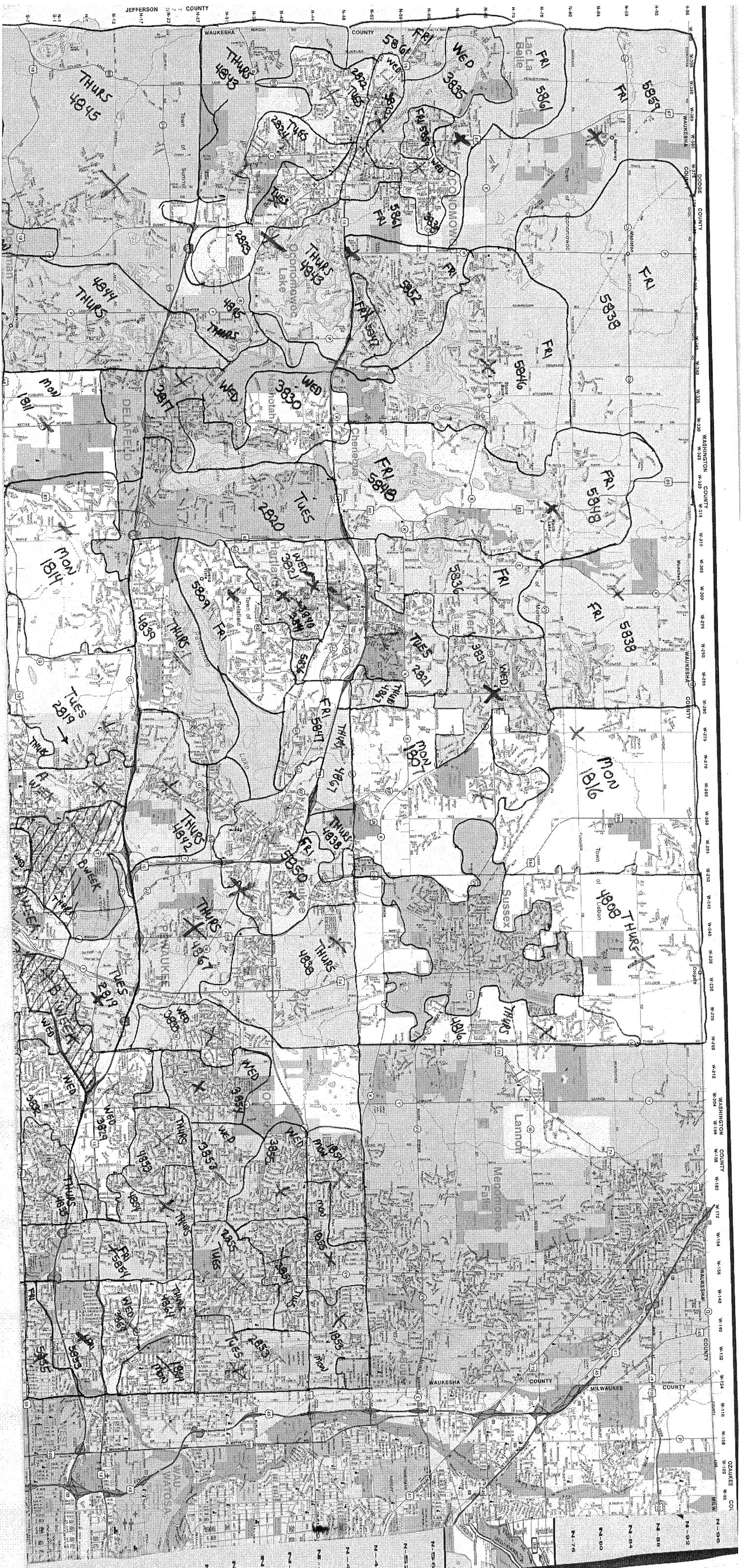
RECYCLING ROUTE	COMMUNITY	DAY	SERVICE TYPE	TRUCK TYPE	AVERAGE # LOADS	
4808	T LISBON	THURS	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/4	
4816	T LISBON	THURS	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/4	
4838	C PEWAUKEE T MERTON	THURS	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/2	
4839	T DELAFIELD C PEWAUKEE	THURS	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/2	
4842	C PEWAUKEE	THURS	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/4	
4843	V OCON LAKE T SUMMIT	THURS	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/4	
4844	T SUMMIT	THURS	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/4	
4845	T SUMMIT	THURS	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/4	
4853	C BROOKFIELD	THURS	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/2	
4854	C BROOKFIELD	THURS	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/2	
4855	C BROOKFIELD	THURS	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/2	
4864	V ELM GROVE	THURS	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/4	
4866	C WAUKESHA	THURS	CONTRACT CURB	BK/ SCOOTERS	1	
4867	C PEWAUKEE	THURS	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/4	
4869	C WAUKESHA	THURS	CONTRACT CURB	SIDELOADER	1 1/4	
4870	C WAUKESHA	THURS	CONTRACT CURB	SIDELOADER	1 1/4	
4871	C WAUKESHA	THURS	CONTRACT CURB	SIDELOADER	1 1/4	

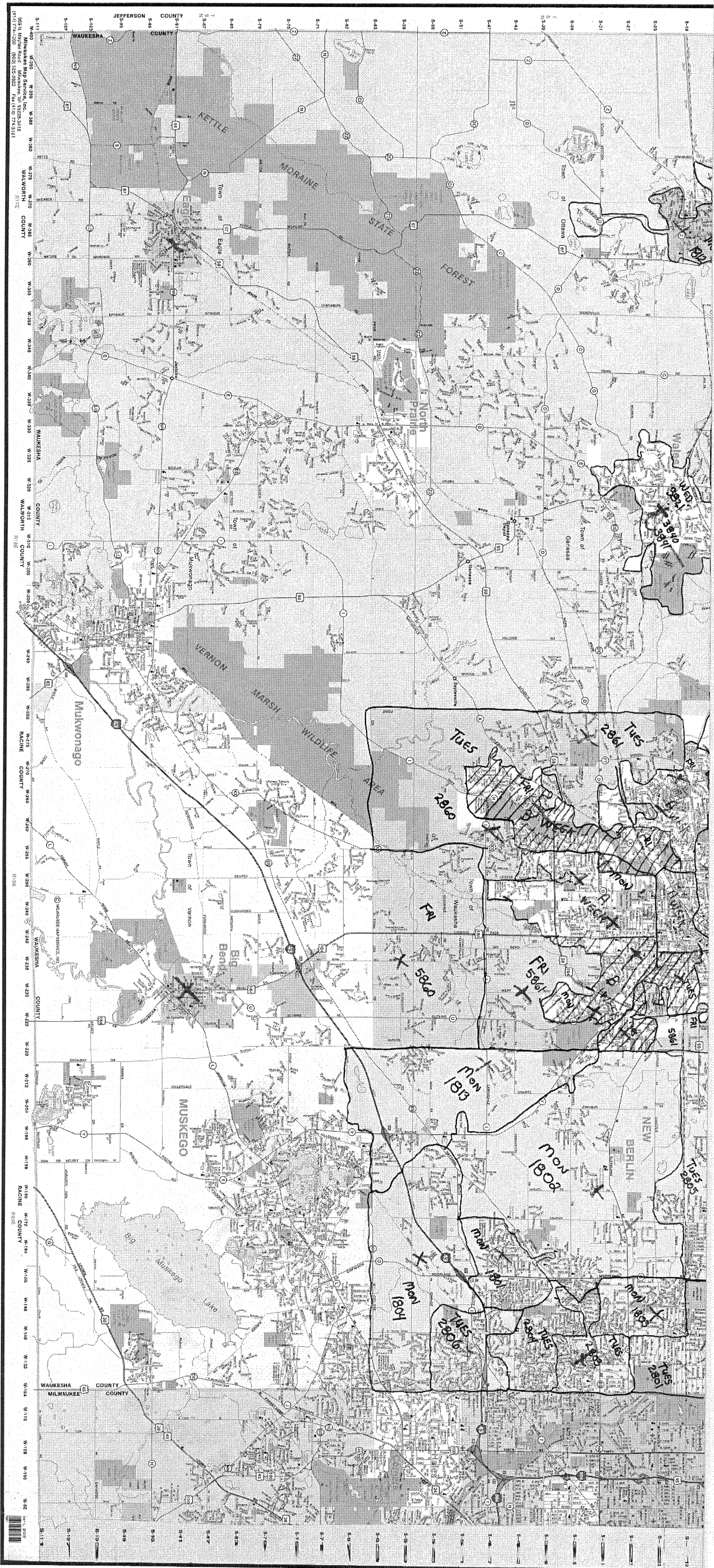
17
?

DAILY RECYCLING COMMUNITY WORKSHEET

5

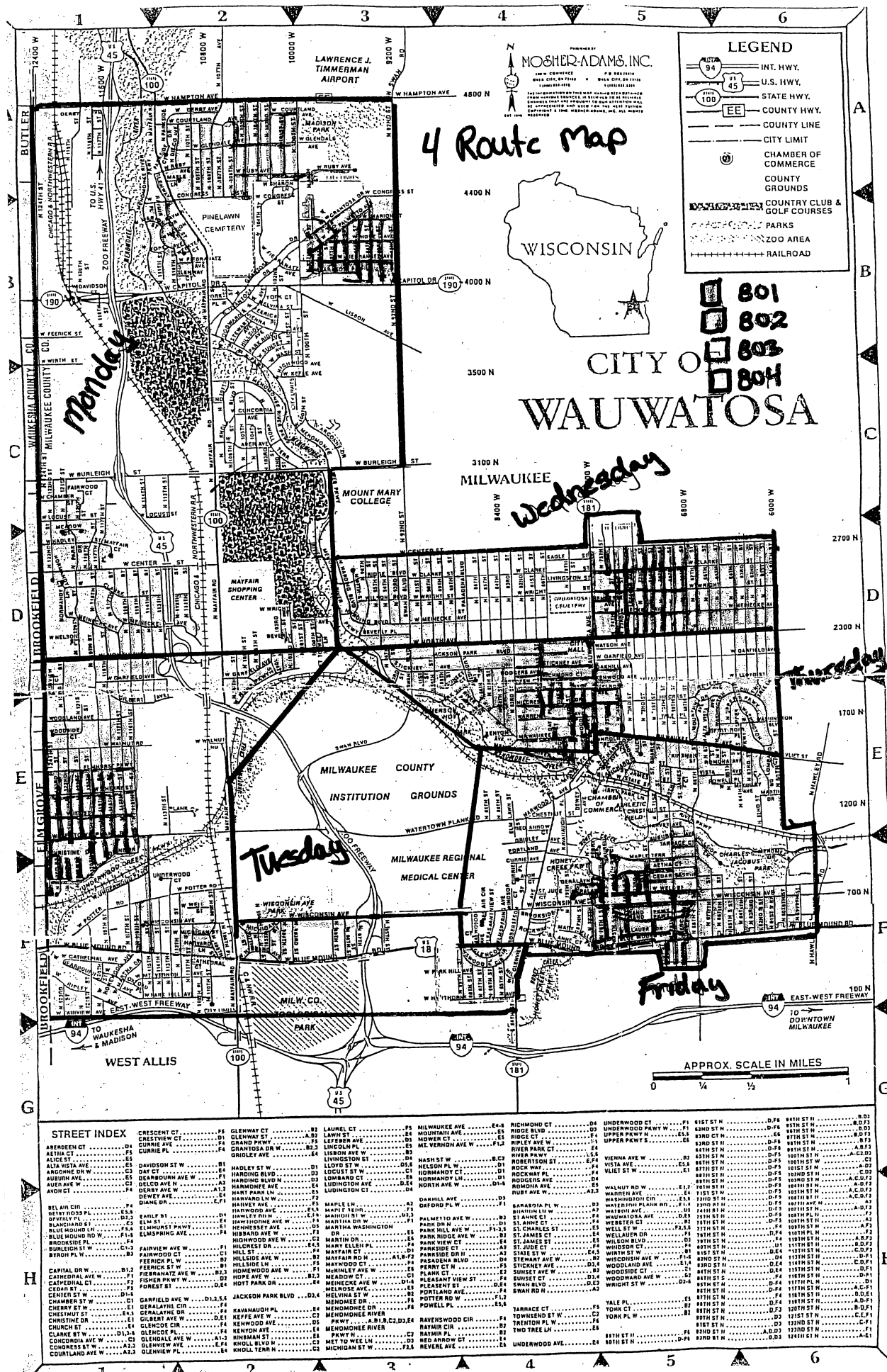
RECYCLING ROUTE	COMMUNITY	DAY	SERVICE TYPE	TRUCK TYPE	AVERAGE # LOADS	
5809	T DELAFIELD	FRI	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/4	
5836	T MERTON	FRI	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1	
5838	T MERTON/ T OCONOMOWOC	FRI	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1	Hwy 8 (Near Mena)
5846	T OCONOMOWOC / T MERTON	FRI	CONTRACT/ PRIVATE CURB	BK/ SCOOTERS	1	Wash Road Rd. (Wash Road)
5847	C PEWAUKEE / T OCONOMOWOC	FRI	CONTRACT/ PRIVATE CURB	BK/ SCOOTERS	1	
5848	T MERTON / V CHENEQUA	FRI	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1	Main Street Mill St (Wash Lake, WI)
5850	V PEWAUKEE	FRI	CONTRACT CURB	BK/ SCOOTERS	1 1/2	
5852	T OCON	FRI	PRIVATE (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/4	
5853	C BROOKFIELD	FRI	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/4	
5854	C BROOKFIELD	FRI	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/4	
5855	C BROOKFIELD	FRI	CONTRACT (CURB/UPDRIVE)	BK/ SCOOTERS	1 1/4	
5859	T OCON	FRI	PRIVATE (CURB/UPDRIVE)	BK/ SCOOTERS	1	Mill St. Division St
5860	T WAUKESHA	FRI	CONTRACT CURB	SIDELOADERS	1	
5861	T WAUKESHA	FRI	CONTRACT CURB	SIDELOADERS	1	
5869	C WAUKESHA	FRI	CONTRACT CURB	SIDELOADERS	1 1/2	
5870	C WAUKESHA	FRI	CONTRACT CURB	SIDELOADERS	1 1/2	
5871	C WAUKESHA	FRI	CONTRACT CURB	SIDELOADERS	1 1/2	
5874	V PEWAUKEE	FRI	CONTRACT CURB	SIDELOADERS	1 1/2	
5886	C WAUKESHA	FRI	CONTRACT CURB	BK/ SCOOTERS	1	
5861	T/Ocon	FRI	CONTRACT CURB	SCOOTERS	1 1/4	





Appendix J

City of Waukesha Recyclables Collection Area



About Earth Tech

Earth Tech is a global provider of consulting, engineering, construction and operations services to the water/wastewater, environmental, transportation and facilities markets. Headquartered in Long Beach, CA, the company was acquired by AECOM Technology Corp. in July 2008. More information on Earth Tech can be found at www.earthtech.aecom.com.

About AECOM

AECOM is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental and energy. With more than 41,000 employees around the world, AECOM is a leader in all of the key markets that it serves. AECOM provides a blend of global reach, local knowledge, innovation, and technical excellence in delivering solutions that enhance and sustain the world's built, natural, and social environments. AECOM serves clients in more than 100 countries and had revenue of \$4.7 billion during the 12-month period ended June 30, 2008. More information on AECOM and its services can be found at www.aecom.com.

Earth Tech AECOM

300 Oceangate, Suite 700
Long Beach, California 90802
T 562.951.2000
F 562.951.2100
www.earthtech.aecom.com